SONY®

VIDEO GRAPHIC PRINTER

UP-890CE
UP-890MD

SERVICE MANUAL

1st Edition (Revised 1)

SAFETY RELATED COMPONENT WARNING

Components identified by shading and ⚠ marked on the schematic diagrams and parts list are critical to safe operation. Replace these components with SONY parts whose part numbers appear as shown in this manual or in supplements published by SONY.

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SECTION 1
GENERAL

This section is extracted from instruction manual.

1-1. SPECIFICATIONS

Thermal head
  Thin-film thermal head (with built-in drive IC) 1024-dot drive

Gradation
  256

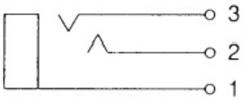
Resolution (in WIDE 1 mode)
  EIA: 970 x 490 dots
  CCIR: 970 x 582 dots

Print size (in NORM and WIDE 1 mode)
  STD mode
    EIA: 95 x 72 mm
    CCIR: 95 x 71 mm
  SIDE mode
    EIA: 127 x 96 mm
    CCIR: 127 x 95 mm

Printing speed (in STD and NORM mode)
  About 3.9 seconds/screen (aspect ratio 4:3)

Picture memory
  786 K x 6 bits

Input/output connectors
  VIDEO IN (BNC)
    EIA or CCIR
    Composite video signals
    1.0 Vp-p, 75 ohms/high-impedance (EIA/CCIR automatically discriminated)
  VIDEO OUT (BNC)
    EIA or CCIR
    Composite video signals
    1.0 Vp-p, 75 ohms, loop-through/EE switchable
  REMOTE (stereo minijack)



1 GND
2 PRINT SIGNAL (TTL)
  Input of LOW pulse over 100 msec. initiates print.
3 PRINT BUSY (TTL)
  Goes HIGH during printing.

Power requirements and consumption
  120 V AC, 50/60 Hz, 1.5 A (UP-890MD)
  220 to 240 V AC, 50/60 Hz, 0.8 A (UP-890CE)

Dimensions
  Approx. 154 x 106 x 303 mm (w/h/d) (6⅛ x 4¼ x 12 inches)

Mass
  Approx. 3.5 kg (7 lb 11 oz), Main unit only

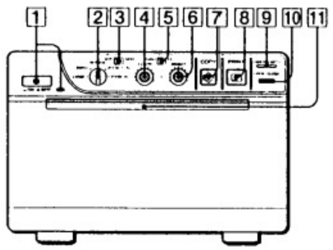
Supplied accessories
  Paper roll (UPP-110HA) (1)
  BNC – BNC connecting cable (1)
  AC power cord (1)
  Head cleaning sheet (1)
  Remote commander RM-91 (1) supplied with UP-890MD only

Design and specifications are subject to change without notice.

1-2. LOCATION AND FUNCTION OF PARTS

For details, refer to the pages indicated in parentheses.

Front



1 **Power ON/OFF switch and indicator**
Turns the power on. The indicator is lit while the power is on.

2 **Printing size selector (13)**
Selects the printing size.

3 **STD (standard)/SIDE selector (13)**
Selects the printing direction.

4 **CONTR (contrast) control (15)**
Adjusts the contrast of the print-outs.

5 **THRU/EE selector (15)**
Selects the video signal output from the VIDEO OUT connector.
THRU: Input signals are directly output to the video monitor.
EE: Input signals are output to the video monitor after being processed by the printer's circuitry.

6 **BRIGHT (brightness) control (15)**
Adjusts the brightness of the print-outs.

7 **COPY button (14)**
Prints another copy of the previous print-out.

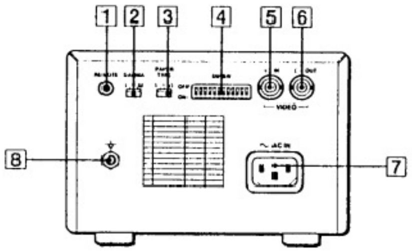
8 **PRINT button (12)**
Prints the picture currently displayed on the video monitor. The picture displayed when you press the PRINT button is stored in memory.

9 **PAPER EMPTY indicator**
Lights when the printer is out of paper.

10 **OPEN/CLOSE button (10, 14)**
Opens or closes the door. Also, stops printing midway.

11 **Paper feeder and cutter**
Cuts the printing paper.

Back



1 **REMOTE connector (5)**
Connect the RM-91 remote commander for controlling print operation from a distance. The RM-91 remote commander is supplied with UP-890MD only.

2 **GAMMA selector (6)**
Changes the print mode to that for high-density printing paper. The selector is effective when the PAPER TYPE selector is set to II or IV.

3 **PAPER TYPE selector (6)**
Sets the type of paper.

4 **DIP SW (switches) (7 – 9)**
Sets the print modes and functions.

5 **VIDEO IN (input) connector (BNC type) (5)**
Connect to the video output connector of the video equipment.

6 **VIDEO OUT (output) connector (BNC type) (5)**
Connect to the video input connector of the video monitor. The output signal type depends on the setting of the THRU/EE selector.

7 **AC IN (AC power input) connector (5)**
Connect to a wall outlet using the supplied AC power cord.

8 **Equipotential terminal**
Equipped only with the UP-890CE/890MD.

1-3. OVERVIEW

The UP-880/890CE/890MD is a black and white video graphic printer that can be used to print images displayed on video monitor.

Clear, consistent print quality

- High definition, 10.2 dots/mm printing using a thermal head with high-speed drive IC.
- 256 gradations of black and white.

Fast printing

- You can make a single print-out in about 3.9 seconds in STD and NORM mode.
- You can make a maximum of 11 copies of the same image continuously.

Two way printing direction and five printing sizes selectable

- The printing direction selector on the front panel enables you to print in vertical and horizontal directions.
- The printing size control on the front panel enables you to select five kinds of printing size.

DIP switches to optimize the printer

- You can make print-outs starting either from the bottom or top of the image by setting the DIRECTION DIP switch.
- You can set the print-out aspect ratio to 4:3 or 1:1 by setting the ASPECT DIP switch.
- You can set the range to be printed by setting the SCAN DIP switch.
- You can save your paper by setting the POSTFEED DIP switch (paper saving function).

Automatic video signal discrimination

The type of input signal, black and white (EIA or CCIR) or input color (NTSC or PAL), is automatically discriminated and printed in same duration and size.

Alarm buzzer

The alarm buzzer prevents you from making any misoperation.

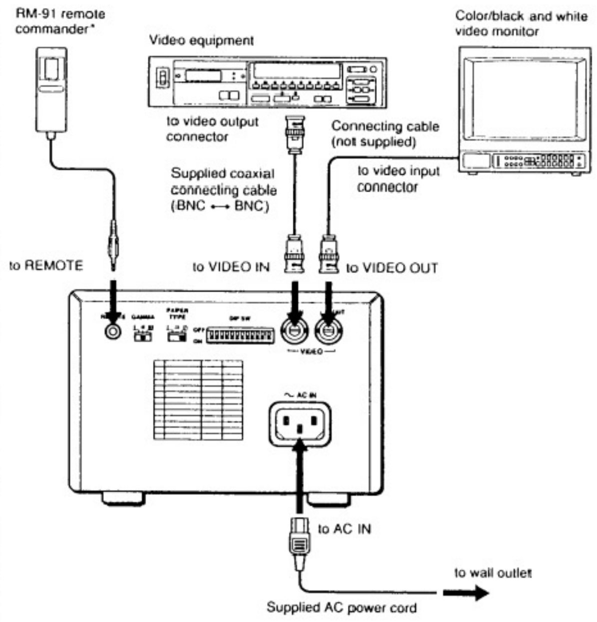
Easy and quick paper loading

You can load paper just by opening the paper lid with the OPEN/CLOSE button and placing the paper roll.

1-4. CONNECTION

Notes

- Turn off the power to each device before making connection.
- Connect the AC power cord last.


RM-91 remote commander*
Video equipment
Color/black and white video monitor
to video output connector
Connecting cable (not supplied)
Supplied coaxial connecting cable (BNC ↔ BNC)
to video input connector
to REMOTE
to VIDEO IN
to VIDEO OUT
VIDEO
AC IN
to AC IN
to wall outlet
Supplied AC power cord

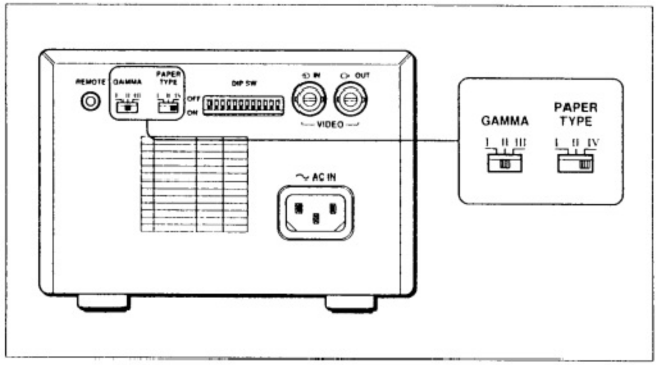
* The RM-91 remote commander is supplied with UP-890MD only.

1-5. BEFORE PRINTING

Setting the Type of Paper

Set the PAPER TYPE selector to the type of paper to be used.
The use of paper other than Sony may result in reduced printer performance and poor print quality.

Type of paper	PAPER TYPE switch position
UPP-110S	I (Normal)
UPP-110HD	II (High density)
UPP-110HA	IV (Enhanced)

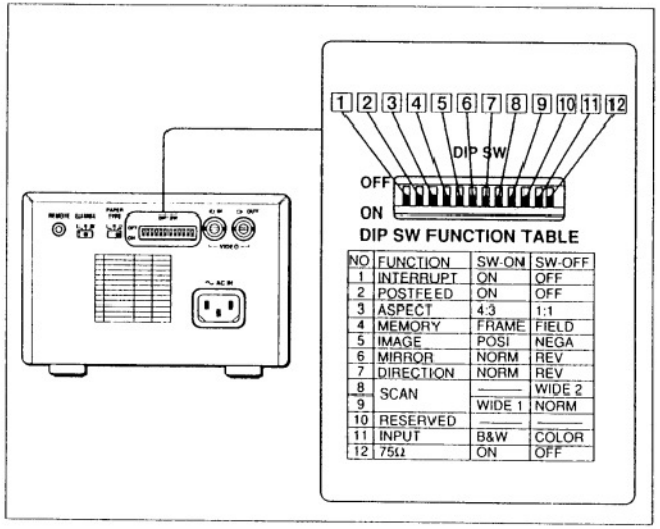


When you use the UPP-110HA or UPP-110HD

When you set the PAPER TYPE selector to II or IV, set the density gradation with the GAMMA selector.
I: Soft gradation
II: Standard
IV: Hard gradation

Setting the DIP Switches

Set the DIP switches according to the required print mode. Before setting the DIP switches, turn the power off. Change the settings using a small pointed tool such as a small screwdriver. The factory settings are as follows.



DIP SW FUNCTION TABLE

NO	FUNCTION	SW-ON	SW-OFF
1	INTERRUPT	ON	OFF
2	POSTFEED	ON	OFF
3	ASPECT	4:3	1:1
4	MEMORY	FRAME	FIELD
5	IMAGE	POSI	NEGA
6	MIRROR	NORM	REV
7	DIRECTION	NORM	REV
8	SCAN	———	WIDE 2
9		WIDE 1	NORM
10	RESERVED	———	———
11	INPUT	B&W	COLOR
12	75Ω	ON	OFF

1 INTERRUPT ON/OFF switch

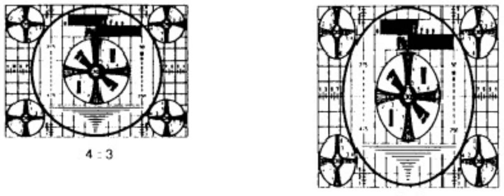
To interrupt the printing under way and print a new picture when you press the PRINT button during printing, set this switch to ON.
To disregard that the PRINT button is pressed during printing and continue the printing under way, set to OFF.
If you press the PRINT button during printing in OFF mode, the alarm buzzer will sound.

2 POSTFEED ON/OFF switch

To feed out extra blank paper once a picture has been printed, set this switch to ON.
To save paper by feeding only a short length of paper after printing a picture, set to OFF. You can make more print-outs per roll of printing paper, but you have to take out and cut the paper yourself.

3 ASPECT 4:3/1:1 switch

Normally keep this switch set to 4:3. When the aspect ratio of the video signal is 1:1, set to 1:1.
The print-out will be longer than a print-out made at 4:3.


4 : 3

1 : 1

4 MEMORY FRAME/FIELD switch

Normally keep this switch set to FRAME (ON). When printing fast-moving pictures (such as a ball being thrown), the print-out may blur. If this happens, set to FIELD. The print-out definition will be poorer but less blurred.

5 IMAGE POSI/NEGA switch

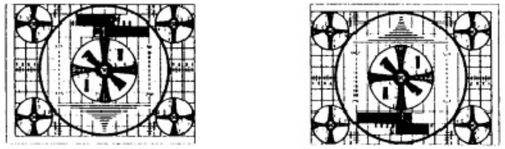
Normally keep this switch set to POSI (ON). To make negative print-outs, set to NEGA (OFF).

6 MIRROR NORM/REV switch

Normally keep this switch set to NORM (ON). To print the right and left sides reversed, set to REV (OFF).

7 DIRECTION NORM/REV switch

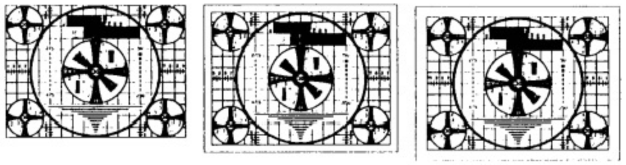
Selects whether the top or bottom of the screen is to be printed first.
Normally keep this switch set to NORM (ON). Printing is done from the bottom of the screen. To start printing from the top of the screen, set to REV (OFF).


NORM

REV

8 9 SCAN NORM/WIDE 1/WIDE 2 switch

Sets the print-out range. The print-out range is widened in the NORM, WIDE 1, and WIDE 2 order.
To print only the image displayed on the standard screen size of the video monitor, set the SCAN switch 9 to NORM (OFF). To print when the signal scans beyond the edge of the standard monitor screen, set the SCAN switch 9 to WIDE 1 (ON) or the SCAN switch 8 to WIDE 2 (OFF). When you set the SCAN switch 8 to the WIDE 2 position, WIDE 2 is selected regardless of the setting of the SCAN switch 9 position.


NORM

WIDE 1

WIDE 2

10 RESERVED switch

Keep this switch set to ON.

11 INPUT B&W/COLOR switch

Set this switch to B & W (ON) when the signal to be printed is black and white. Set to COLOR (OFF) when the signal is color.

12 75Ω ON/OFF switch

Set this switch to OFF when a video monitor or other video equipment is connected to the VIDEO OUT connector.
Set to ON when nothing is connected to the VIDEO OUT connector.
When you connect two printers to one video equipment, set the 75Ω switch of one of the printer to ON, and the other to OFF.

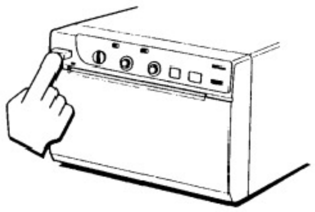
1-6. LOADING PAPER

Notes

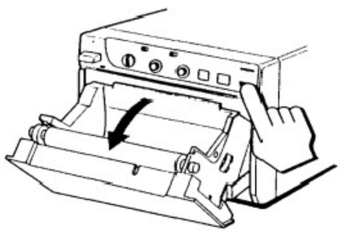
- Do not fold the paper or touch the printing surface. Dust on the printing surface will result in poor print quality.
- After loading the paper roll, pull out and cut off the first 15 to 20 cm (6 to 7⅞ inches) to remove any slack.
- Use only UPP-110 series paper (p. 19).
- Set the PAPER TYPE selector according to the paper type (p. 6).

Loading

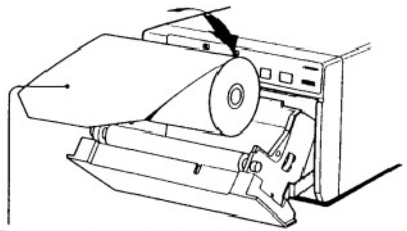
1 Press the power ON/OFF switch to turn on the printer.



2 Press the OPEN/CLOSE button to open the paper lid.

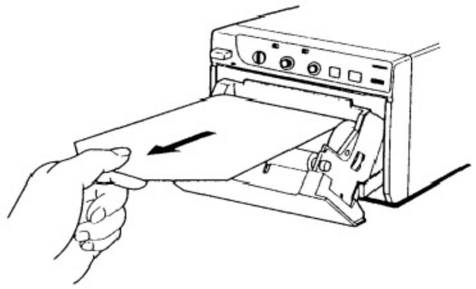


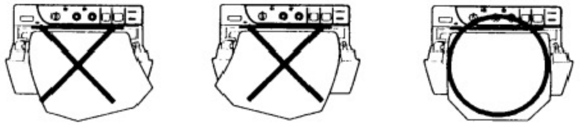
3 Place the paper roll in the printer.



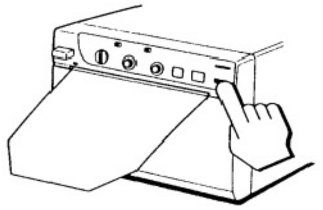
Place the paper with the thermo-sensitive side (printing side) up.

4 Pull out the first 15 to 20 cm (6 to 7⅞ inches) of the paper to remove any slack in the roll.





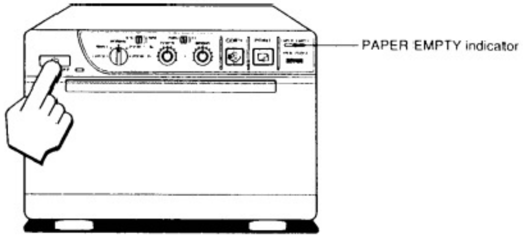
5 Press the OPEN/CLOSE button to close the paper lid.
You can also close the paper lid simply by pushing it.



Before making print-outs
- Are the connections correct? (p. 5)
- Is the paper roll loaded properly? (p. 10).
- Is the paper type set correctly? (p. 6).
- Are the DIP switches set correctly? (p. 7 – 9)
- Is the print source being input?

Making Print-outs

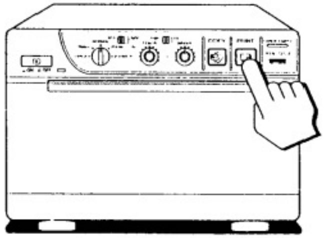
1 Press the power ON/OFF switch to turn on the printer.
The power indicator lights.



2 Make sure that the PAPER EMPTY indicator is not lit.
If lit, load paper.

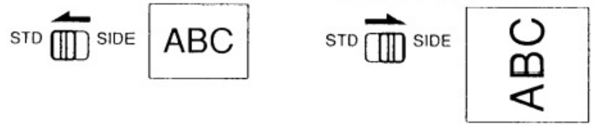
3 Select the printing direction and size.
See "Selecting the Printing Direction" and "Selecting the Printing Size" on the next page.

4 When the picture you want to print is on the video monitor, press the PRINT button.
The printer makes a print-out of the picture displayed at the instant you press the PRINT button.



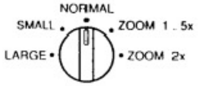
Selecting the printing direction

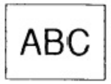
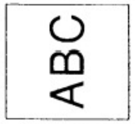
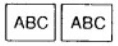
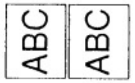
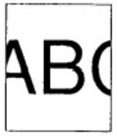
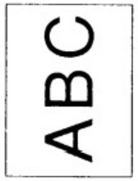
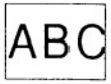
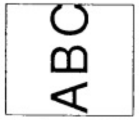
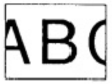
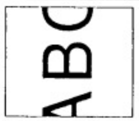
You can select the vertical or horizontal direction using the STD/SIDE selector.
To print in the vertical direction, set to STD.
To print in the horizontal direction, set to SIDE.



Selecting the printing size

You can print in small or large size.
Also you can enlarge the center of the picture by 1.5 or 2 times.



Control position (mode)	Priting size	
	Vertical (STD)	Horizontal (SIDE)
NORMAL		
SMALL		
LARGE		
ZOOM 1.5X		
ZOOM 2X		

To print in SMALL mode

Press the PRINT button twice. When you press the PRINT button once, the buzzer sounds. The printer starts printing after the PRINT button is pressed twice.

Stopping printing midway

Press the OPEN/CLOSE button while printing or while copying. The printer stops printing.

To stop printing and print another picture displayed on the video monitor

To do this, the DIP switch [1] (INTERRUPT) must be set to ON (p. 7).
Press the PRINT button while printing or copying. The printer stops printing and starts printing the picture displayed at the instant you press the PRINT button.

Making copies of the last print-out

Press the COPY button. The printer makes a copy of the last print-out. The last print-out is retained in the printer's memory until you press the PRINT button again or turn the power off.

To copy in different sizes

You can copy the last print-out in different sizes.
Before pressing the COPY button, select the printing size as described in "Selecting the Printing Size".

Notes

- If you press the COPY button immediately after turning the power on, the alarm buzzer will sound as nothing is stored in memory.
- In SMALL mode (p. 13), if you press the COPY button after you have pressed the PRINT button only once, the alarm buzzer will sound and the printer will not copy.

To make multiple copies of the same print-out

Press the COPY button as many times as necessary (maximum 11 copies including the first print-out) while printing or copying the first print-out. Each time you press the COPY button, the short buzzer sounds.

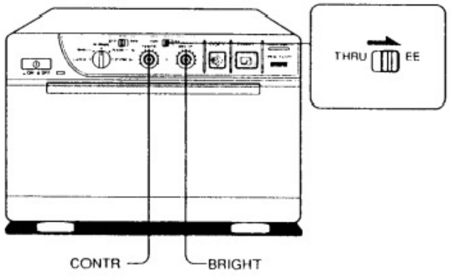
To stop copying midway

Press the OPEN/CLOSE button.

Adjusting the Contrast and Brightness

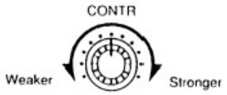
You can adjust the contrast and brightness of the print-out.

1 Set the THRU/EE selector to EE.
You can check the adjusted picture on the video monitor.

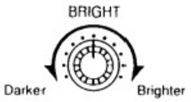


2 Adjust the brightness with the BRIGHT control and the contrast with the CONTR control while watching the picture on the video monitor.

Adjusting the contrast



Adjusting the brightness



To directly input the video signal from the video equipment, which is connected to the printer, to the video monitor

Set the THRU/EE selector to THRU. The video signal is directly input to the video monitor without being processed by the printer's circuitry.

1-8. PRECAUTIONS

On the safety

- Check the operating voltage before operation.
  Operate the unit only with a power source specified in "Specifications".
- Stop operation immediately if any liquid or solid object falls into the cabinet.
  Unplug the unit and have it checked by qualified personnel.
- Unplug the unit from a wall outlet if you will not be using it for a long time.
  Disconnect the power cord by grasping the plug. Never pull the cord itself.
- Do not disassemble the cabinet. Refer servicing to qualified personnel only.
- Do not touch the cutting blade of the printer.
- Connect the power plug of the printer to a wall outlet having protective earth terminal. The safety earth should be properly established.

On operation

Do not turn the power off while the printer is printing. The thermal head may be damaged.

On printer carriage

Do not carry and move the printer when the paper roll is placed in the printer. Doing so may cause malfunction.

On installation

- Place the printer on a level and stable surface during operation.
- Do not install the printer near heat sources. Avoid locations near radiators or air ducts, or place subject to direct sunlight or excessive dust, humidity, mechanical shock or vibration.
- Provide adequate air circulation to prevent heat build-up. Do not place the printer on surfaces such as rugs, blankets, etc., or near materials such as curtains and draperies.

Maintenance

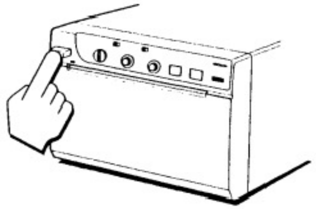
Cleaning the cabinet

Do not use strong solvents to clean the printer. Thinner or abrasive cleansers will damage the cabinet.

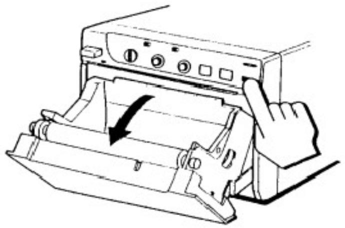
Cleaning the thermal head

If the print-out is dirty or white stripes appear on the print-outs, clean the thermal head using the supplied cleaning sheet.

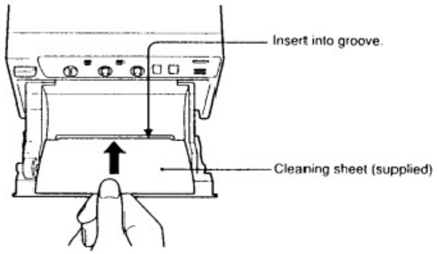
1 Press the power ON/OFF switch to turn on the printer.



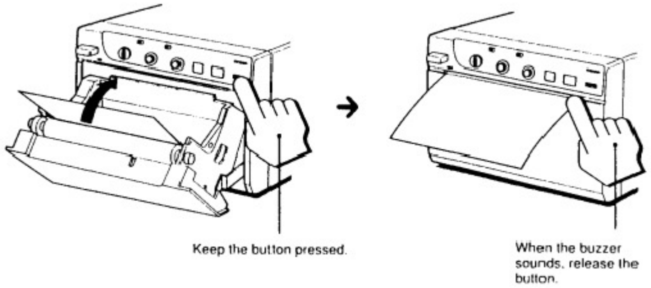
2 Press the OPEN/CLOSE button to open the paper lid.



3 Insert the cleaning sheet, with the black surface facing down, into the groove in the paper lid.



4 Press the OPEN/CLOSE button and keep it pressed.
The paper lid closes and the printer starts cleaning the head.
When the buzzer sounds and the printer starts ejecting the cleaning sheet, release the OPEN/CLOSE button.



5 Remove the cleaning sheet.

Notes

- Do not press the PRINT or COPY button while the cleaning sheet is in the printer.
- Clean the head only when necessary. If you clean the head too often, it may cause malfunction.

1-9. ON THE TYPE OF PAPER

Type of paper

- Use only the Sony UPP-110 series paper. The use of other paper may result in reduced printer performance and poor print quality.
- The following types of paper are available.

Printing density	Type of paper
TYPE I (Normal)	UPP-110S
TYPE II (High density)	UPP-110HD
TYPE IV (Enhanced)	UPP-110HA

Storing paper

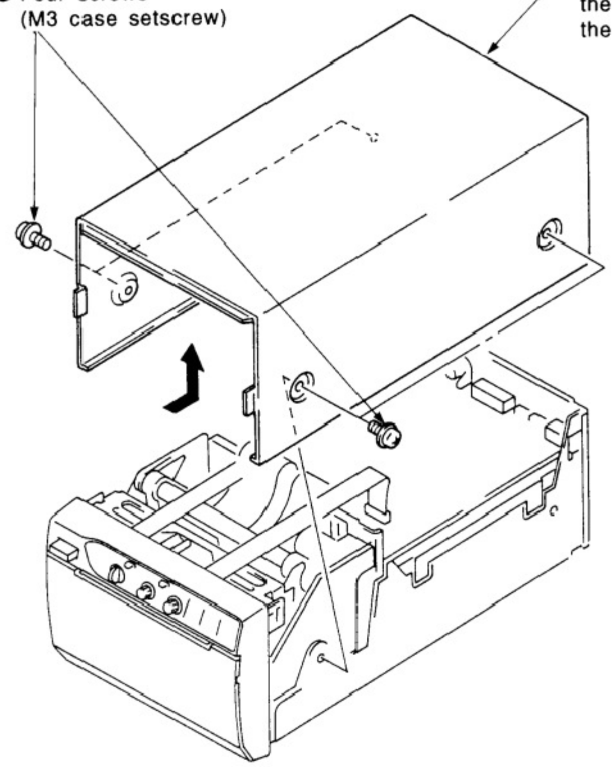
- Store unused or printed paper in a cool, dark place (below 30°C or 86°F). We recommend that you store printed paper in a polypropylene pouch.
- Do not store unused or printed paper in hot or humid place.
- Do not leave unused or printed paper in direct sunlight or other bright place for extended periods.
- Do not allow any volatile organic solvent or vinyl chloride to touch the printed paper. Alcohol, plastic tape or film will fade the print-out.
- To attach printed paper to another piece of paper, use double-sided adhesive tape, or water-based or solid glue.
- Do not stack printed paper on or under a diazo copy sheet. The print-out may become discolor in black.

1-10. TROUBLESHOOTING

Symptom	Cause/remedy
White specks on first few print-outs.	When printing with a newly inserted roll of paper, dust on the surface of the paper may cause white specks on the print-outs. → Feed the paper by pressing the OPEN/CLOSE button until clean paper appears.
Printing does not start when you press the PRINT button.	• Paper is not fed. → Is the paper slack? → Is the power turned on? → Are all connections correct? (p. 5) → Did you press the PRINT button twice in SMALL mode? • When the alarm buzzer sounds: → Has the thermal head overheated? → Is the video signal of the picture input? → Is the paper loaded correctly? • Paper is fed, but printing does not start. → Is the paper loaded with the thermo-sensitive side up?
Black borders or missing portions around the print-out.	This may result according to the video signal input to the printer. → Change the setting of the SCAN switches (DIP switches $\boxed{8}$, $\boxed{9}$). (p. 9)
Paper jam	• Open the paper lid by pressing the OPEN/CLOSE button, then pull the jammed paper slowly and remove it. • There is condensation within the unit. → Moving the unit suddenly from a cold place to a warm place often results in condensation forming. In the event of condensation forming, remove the paper, turn off the power and leave the unit for about one to two hours.
Print-out is dirty.	The thermal head is dirty. → Clean the thermal head with the supplied head cleaning sheet. (p. 17)
The printer stops printing when it prints continuously black pictures.	This is likely to occur when the printer prints continuously 15 or more black pictures. In such a case, the buzzer sounds. This is because that the protective circuit works against heat build-up of the thermal head. Stop printing for a while.
White lines or small letters on the screen are not printed clearly.	Is the INPUT switch (DIP SWITCH $\boxed{11}$) set to B & W when the input signal is a black and white signal? (p. 9)
Small squares appear over the whole screen.	Is the INPUT switch (DIP switch $\boxed{11}$) set to COLOR when the input singal is a color signal? (p. 9)
The print-out is too dark or too light.	• Is the 75Ω switch (DIP switch $\boxed{12}$) set correctly? (p. 9) • Is the GAMMA selector set correctly? (p. 6)
The print-out seems stretched.	The ASPECT switch (DIP switch $\boxed{3}$) is set to 1:1. → Set to 4:3. (p. 8)

SECTION 2
DISASSEMBLY

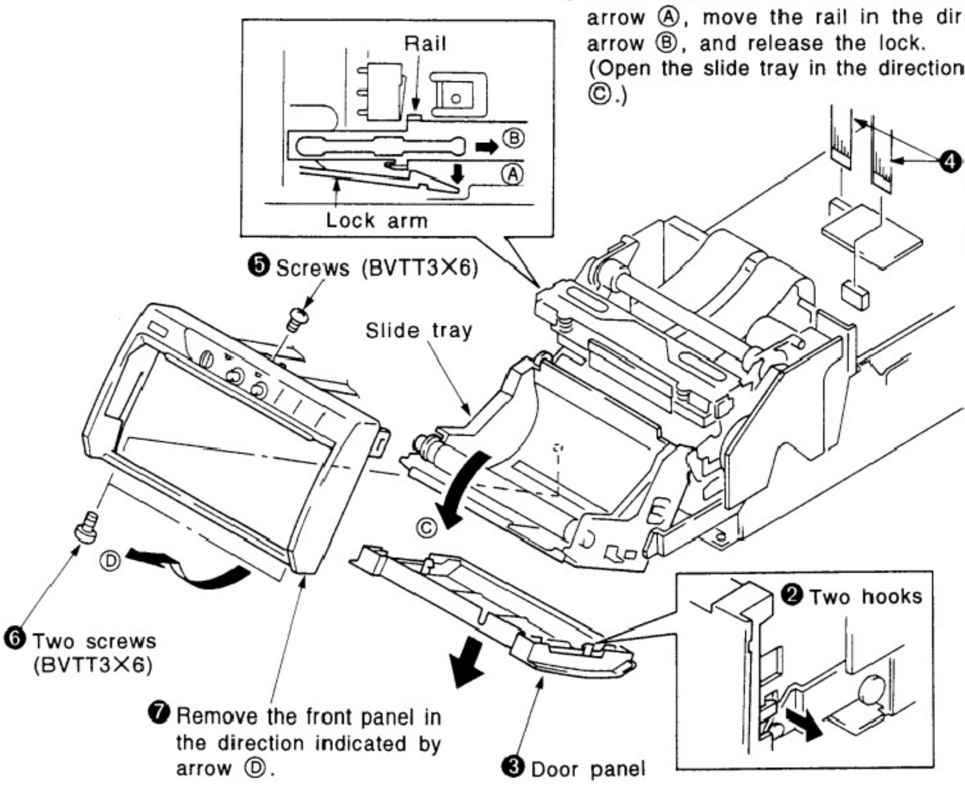
2-1. REMOVING THE TOP COVER



❶ Four screws (M3 case setscrew)

❷ Remove the top cover in the direction indicated by the arrow.

2-2. REMOVING THE DOOR PANEL AND FRONT PANEL UNIT



❶ Push down the lock arm in the direction of arrow Ⓐ, move the rail in the direction of arrow Ⓑ, and release the lock. (Open the slide tray in the direction of arrow Ⓒ.)

❷ Two hooks

❸ Door panel

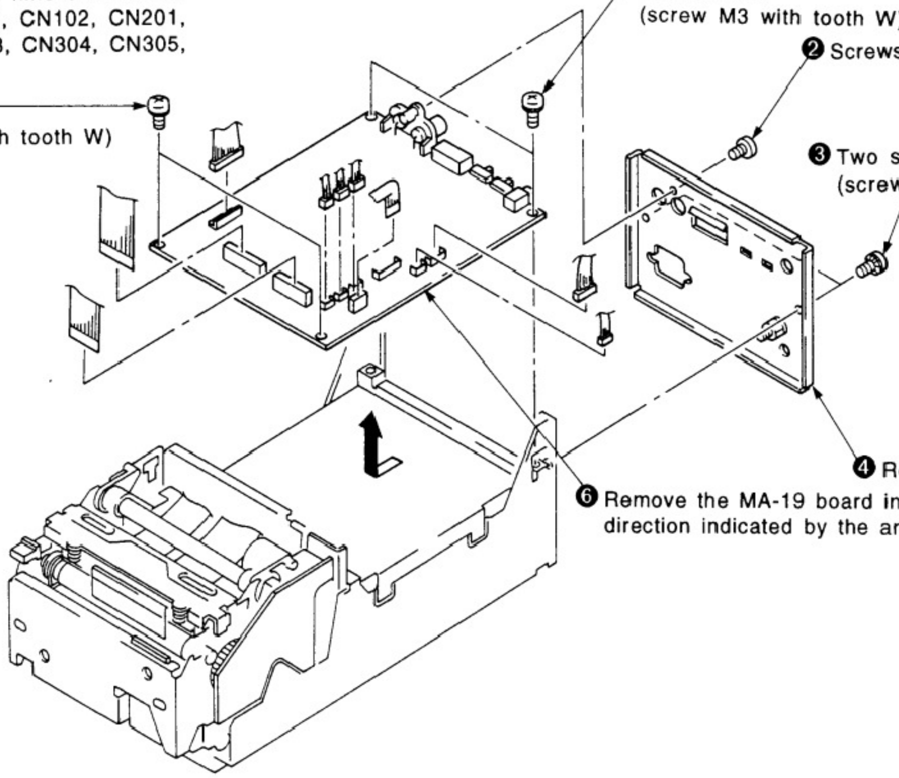
❹ Flat electric wires (from 7-pin connector (CN2) and 10-pin connector (CN301) on the MA-19 board)

❺ Screws (BVTT3X6)

❻ Two screws (BVTT3X6)

❼ Remove the front panel in the direction indicated by arrow Ⓓ.

2-3. REMOVING THE MA-19 BOARD



❶ Disconnect the nine connectors.
(CN51, CN101, CN102, CN201,
CN202, CN303, CN304, CN305,
and CN306)

❷ Screws (B3×8)

❸ Two screws
(screw M3 with tooth W)

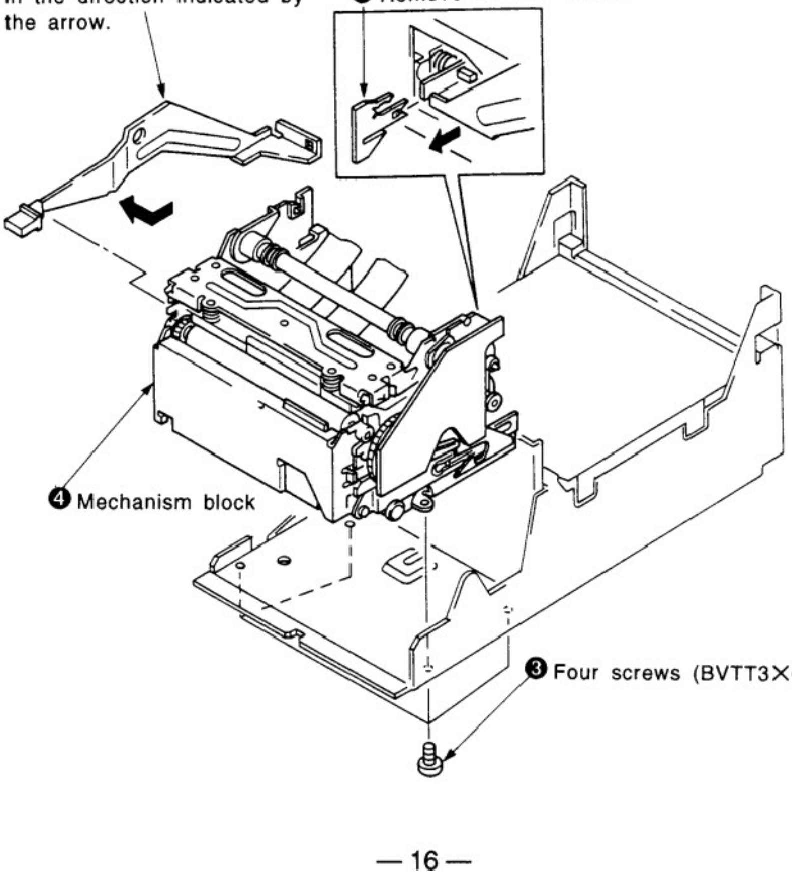
❹ Rear panel

❺ Four screws
(screw M3 with tooth W)

❺ Four screws
(screw M3 with tooth W)

❻ Remove the MA-19 board in the direction indicated by the arrow.

2-4. REMOVING THE MECHANISM BLOCK



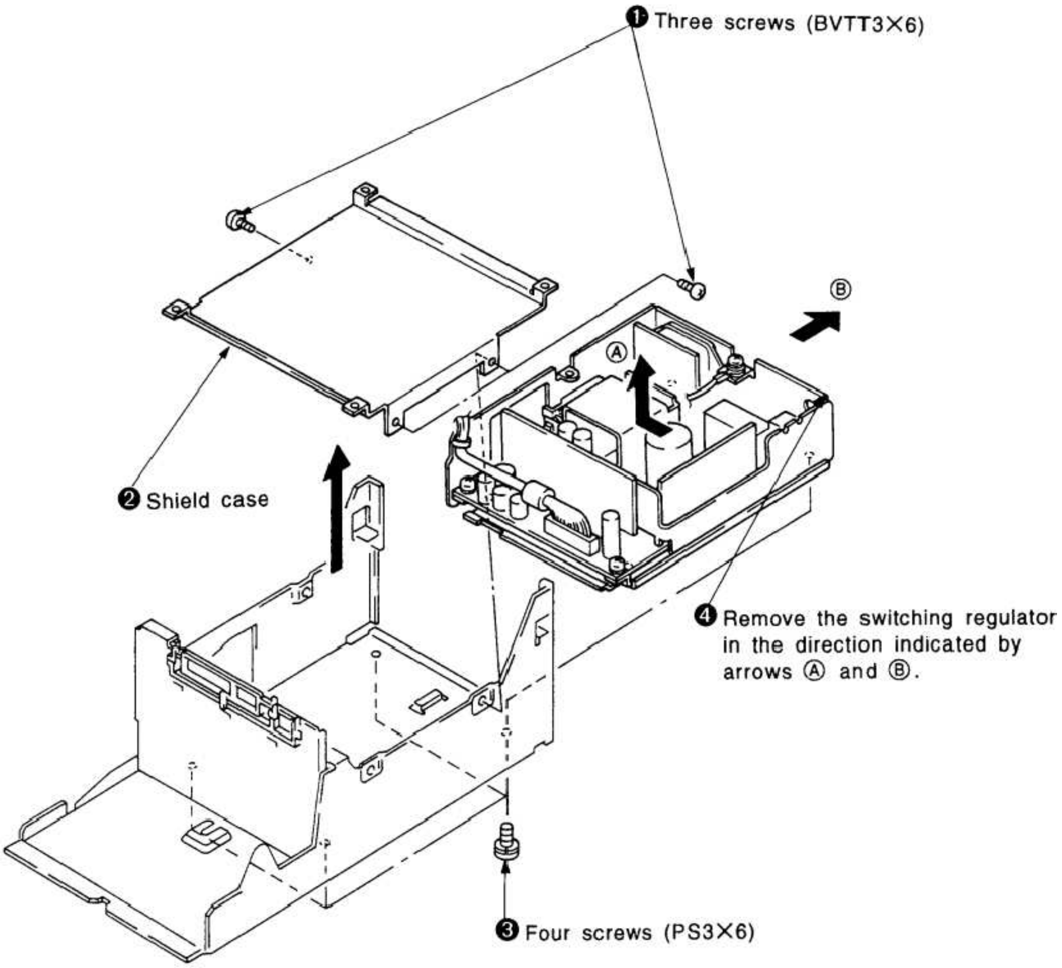
❶ Remove the rod stopper.

❷ Remove the power switch rod in the direction indicated by the arrow.

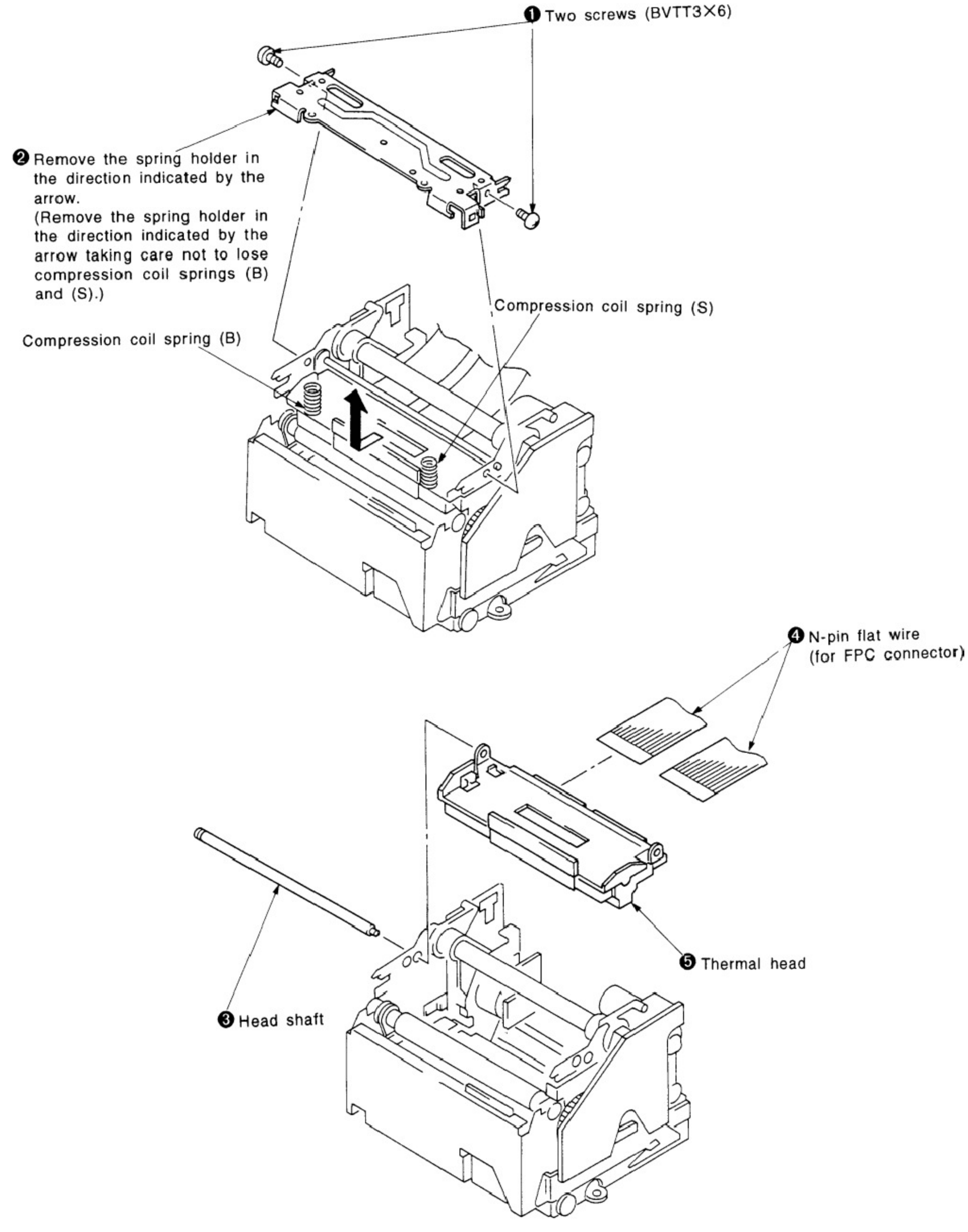
❸ Four screws (BVTT3×6)

❹ Mechanism block

2-5. REMOVING THE SHIELD CASE AND SWITCHING REGULATOR


❶ Three screws (BVTT3×6)
Ⓑ
Ⓐ
❷ Shield case
❹ Remove the switching regulator in the direction indicated by arrows Ⓐ and Ⓑ.
❸ Four screws (PS3×6)

2-6. REMOVING THE THERMAL HEAD



❶ Two screws (BVTT3×6)

❷ Remove the spring holder in the direction indicated by the arrow.
(Remove the spring holder in the direction indicated by the arrow taking care not to lose compression coil springs (B) and (S).)

Compression coil spring (S)
Compression coil spring (B)

❸ Head shaft

❹ N-pin flat wire (for FPC connector)

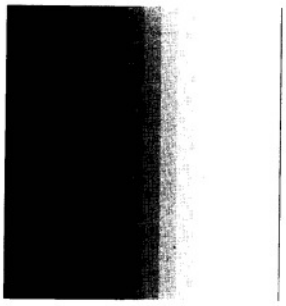
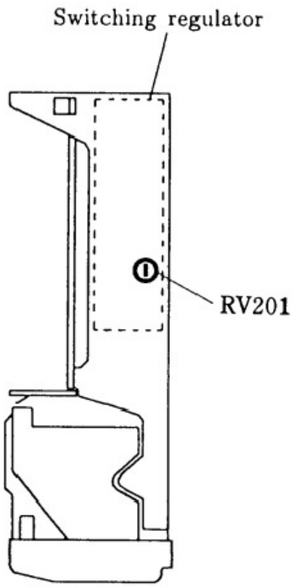
❺ Thermal head

SECTION 3
ADJUSTMENTS

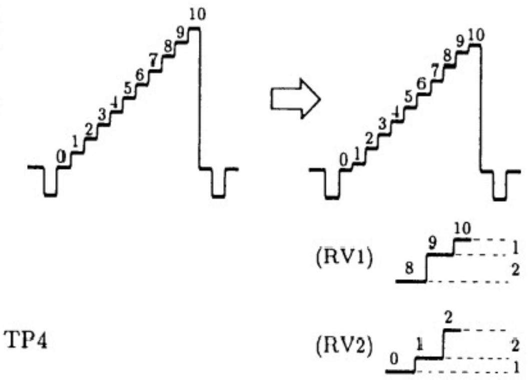
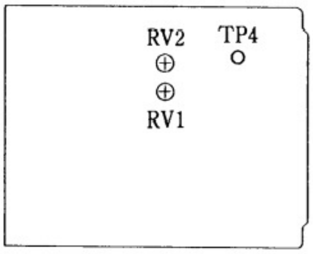
Measuring Equipment Required

1. Oscilloscope
2. Frequency counter
3. Color-bar pattern generator (1410 : NTSC and 1411 : PAL signal generator)
4. Digital multimeter

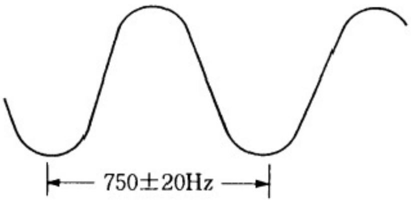
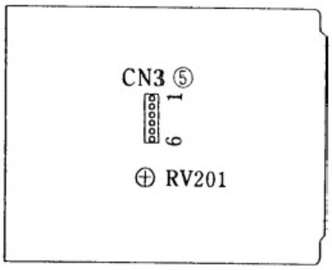
3-1. HEAD VOLTAGE ADJUSTMENT

Conditions for adjustment	Specification	Adjutment
· Input signal : NTSC or PAL signal (1410 or 1411 signal generator) · Turn on the POWER switch while pressing the PRINT and COPY buttons at the same time. Note : Do not release the switch until the buzzer sounds. · For printing-out, press the PRINT button. · Set DIP switches 1 through 12 to ON (lower position), and set DIP switch 1 to OFF. · Use the UPP-110HA paper. · Adjust the paper-type slide switch to the right edge (IV).	 Fig. 1 Adjust RV201 to make the 17-step gradation signal smooth as shown in Fig. 1.	⊘ RV901 

3-2. BRIGHTNESS CONTRAST ADJUSTMENT

Conditions for adjustment	Specification	Adjutment
· Input signal : 10-step signal (1410 or 1411 signal generator) · Set the CONTR and BRT control knobs to the center position.	 0 1 2 3 4 5 6 7 8 9 10 0 1 2 3 4 5 6 7 8 9 10 (RV1) 8 9 10 1 2 TP4 (RV2) 0 1 2 2 1	⊘ RV1/C-2 (MA-19) ⊘ RV1/C-2 (MA-19) 

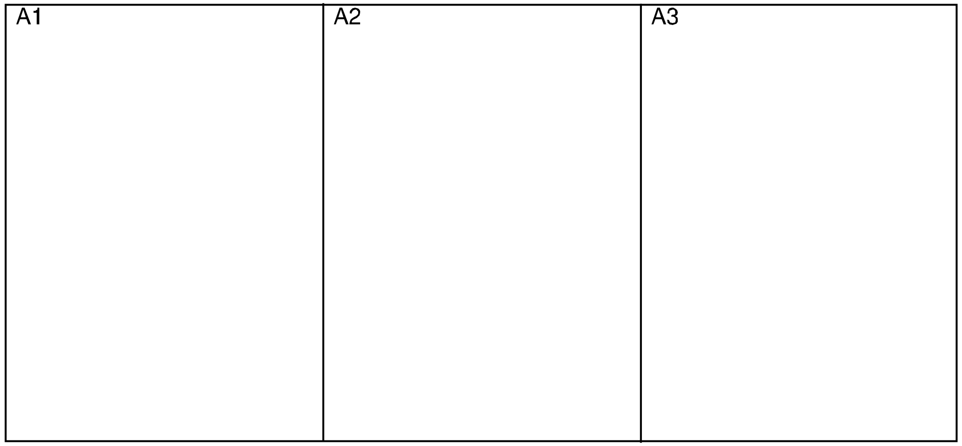
3-3. MOTOR SPEED ADJUSTMENT

Conditions for adjustment	Specification	Adjustment
· Input signal : Color-bar (1410 or 1411 signal generator) · Press the PRINT button to measure the waveform at pin ⑤ of connector CN3. · Set DIP switches 1 through 12 to ON (lower position). · Use the UPP-110HA paper. Note : Do not adjust while a print blank strip is fed.	 CN3 ⑤	⊘ RV201/C-3 (MA-19) 

BLOCK DIAGRAMS

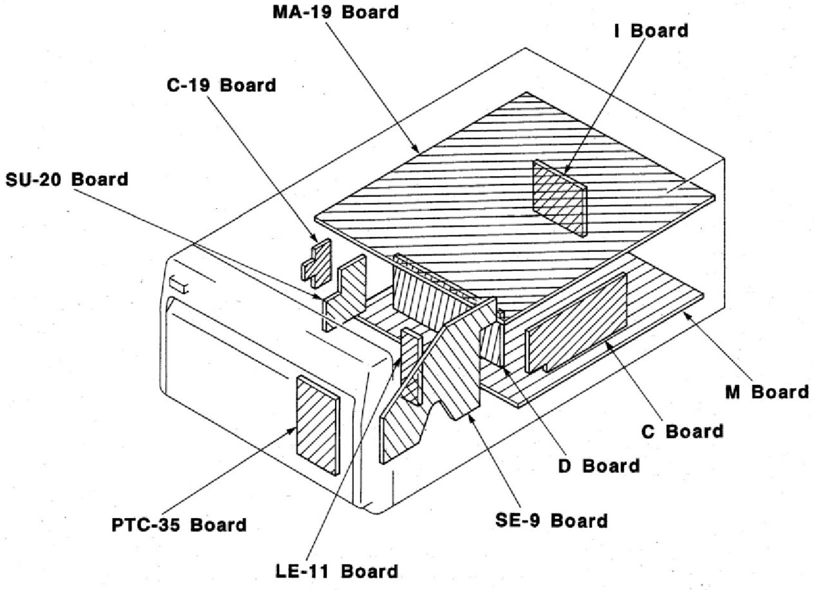
BLOCK DIAGRAMS

The following diagram has been devided into 3 sections as noted on the grid shown below.

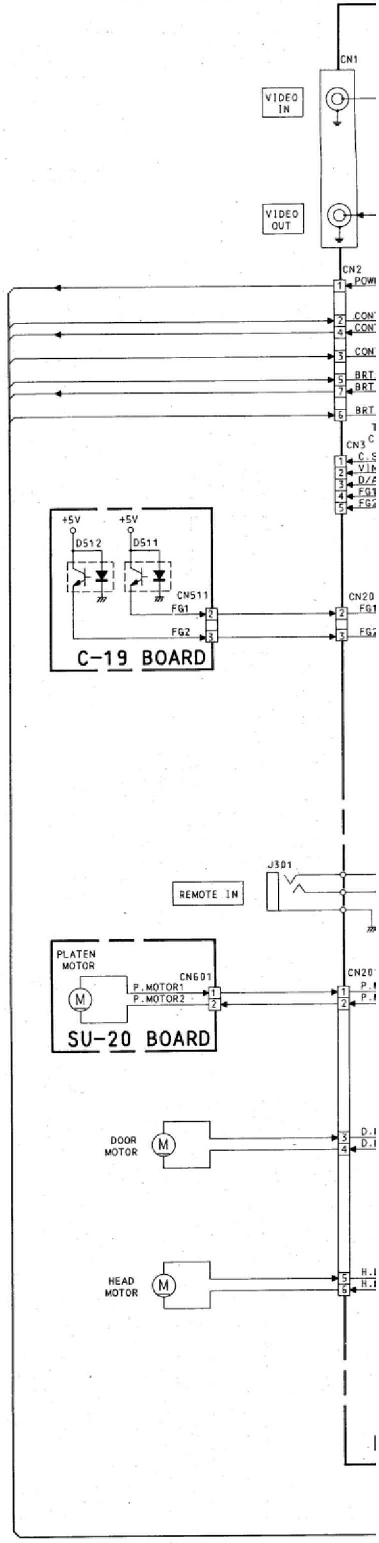


SECTION 4
DIAGRAMS

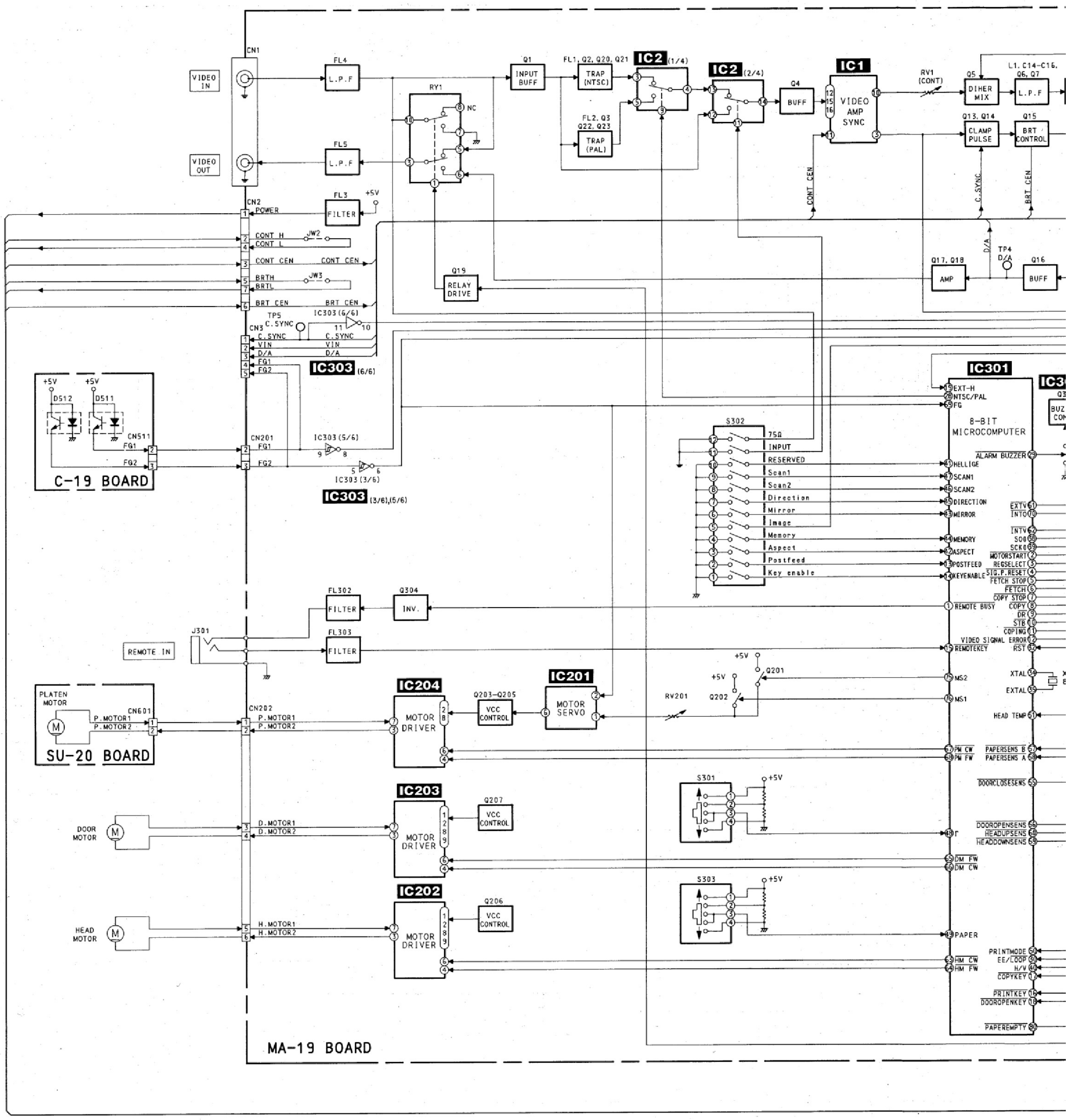
4-1. CIRCUIT BOARDS LOCATION


MA-19 Board
I Board
C-19 Board
SU-20 Board
M Board
C Board
D Board
SE-9 Board
PTC-35 Board
LE-11 Board

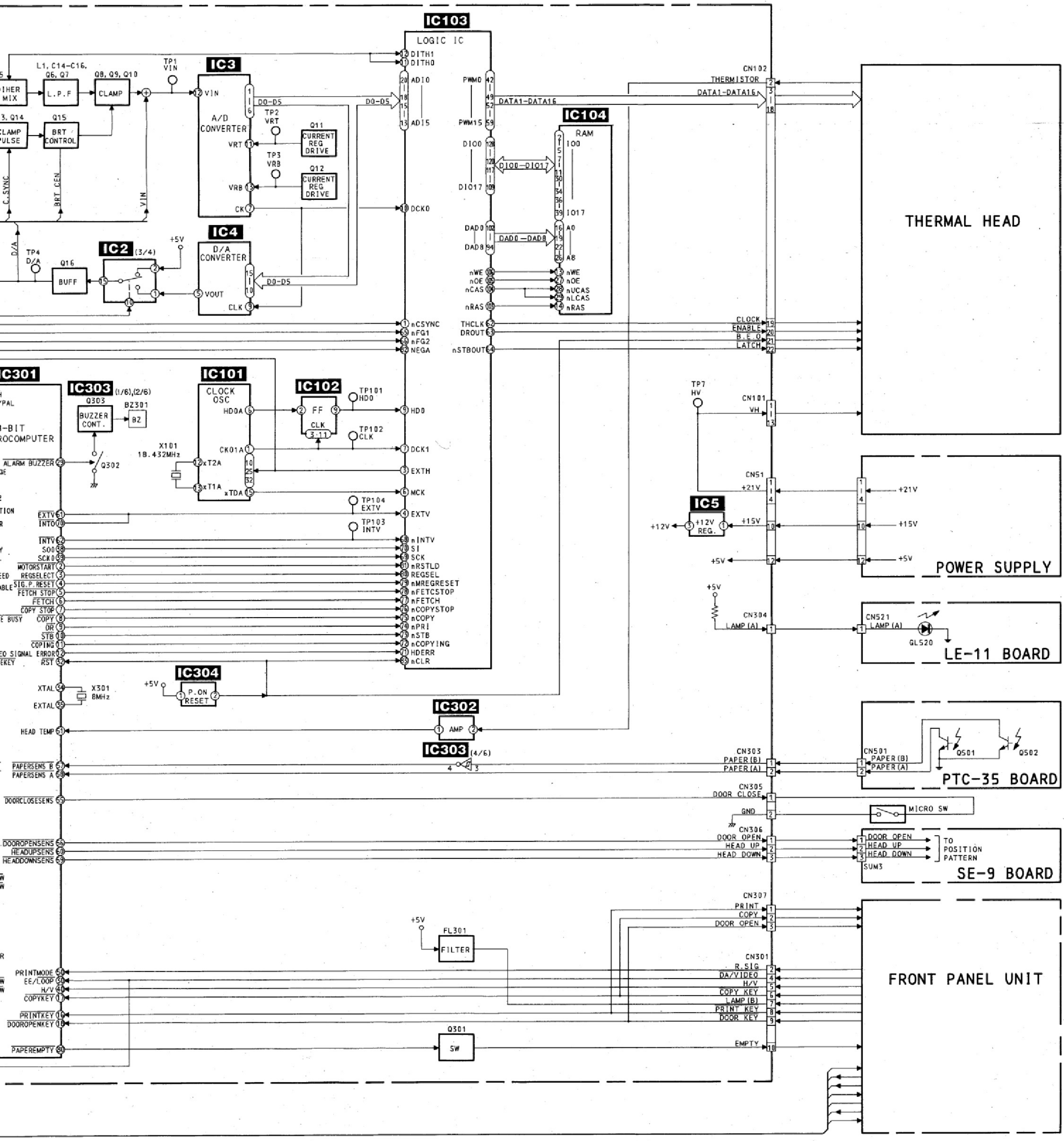
4-2. BLOCK DIAGRAM


CN1
VIDEO IN
VIDEO OUT
CN2
POW
CON
CON
CON
BRT
BRT
BRT
CN3
C.S
V.IN
D/A
FG1
FG2
+5V
+5V
D512
D511
CN511
FG1
FG2
C-19 BOARD
CN20
FG1
FG2
J301
REMOTE IN
PLATEN MOTOR
M
CN601
P.MOTOR1
P.MOTOR2
SU-20 BOARD
CN20
DOOR MOTOR
M
HEAD MOTOR
M

4-2. BLOCK DIAGRAM


VIDEO IN
VIDEO OUT
CN1
FL4
L.P.F
FL5
RY1
Q1
INPUT BUFF
FL1, Q2, Q20, Q21
TRAP (NTSC)
FL2, Q3 Q22, Q23
TRAP (PAL)
IC2 (1/4)
IC2 (2/4)
Q4
BUFF
IC1
VIDEO AMP SYNC
RV1 (CONT)
Q5
DIHER MIX
L1, C14-C16, Q6, Q7
Q13, Q14
CLAMP PULSE
Q15
BRT CONTROL
CONT CEN
C.SYNC
BRT CEN
D/A
TP4 D/A
Q17, Q18
AMP
Q16
BUFF
Q19
RELAY DRIVE
CN2
POWER
FL3
FILTER
+5V
CONT H
CONT L
JW2
CONT CEN
BRTH
BRTL
JW3
BRT CEN
TP5
C.SYNC
CN3
IC303 (6/6)
VIN
D/A
FG1
FG2
IC303 (6/6)
C-19 BOARD
D512
D511
CN511
CN201
IC303 (5/6)
IC303 (3/6)
IC303 (3/6),(5/6)
IC301
8-BIT MICROCOMPUTER
EXT-H
NTSC/PAL
FG
S302
75Ω
INPUT
RESERVED
Scan1
Scan2
Direction
Mirror
Image
Memory
Aspect
Postfeed
Key enable
ALARM BUZZER
HELLIGE
SCAN1
SCAN2
DIRECTION
MIRROR
MEMORY
ASPECT
POSTFEED
KEYENABLE
EXTV
INTO
INTV
SO0
SCK0
MOTORSTART
REGSELECT
SIG.P.RESET
FETCH STOP
FETCH
COPY STOP
COPY
DR
STB
COPING
VIDEO SIGNAL ERROR
RST
REMOTE BUSY
REMOTEKEY
FL302
FILTER
Q304
INV.
J301
REMOTE IN
FL303
FILTER
IC201
MOTOR SERVO
RV201
Q201
Q202
MS2
MS1
XTAL
EXTAL
HEAD TEMP
PLATEN MOTOR
CN601
P.MOTOR1
P.MOTOR2
SU-20 BOARD
CN202
IC204
MOTOR DRIVER
Q203-Q205
VCC CONTROL
PM CW
PM FW
PAPERSENS B
PAPERSENS A
DOORCLOSESENS
IC203
Q207
VCC CONTROL
DOOR MOTOR
D.MOTOR1
D.MOTOR2
S301
DOOROPENSENS
HEADUPSENS
HEADDOWNSENS
DM FW
DM CW
IC202
Q206
VCC CONTROL
HEAD MOTOR
H.MOTOR1
H.MOTOR2
S303
PAPER
PRINTMODE
EE/LOOP
H/V
COPYKEY
HM CW
HM FW
PRINTKEY
DOOROPENKEY
PAPEREMPTY
MA-19 BOARD
IC3
BUZ

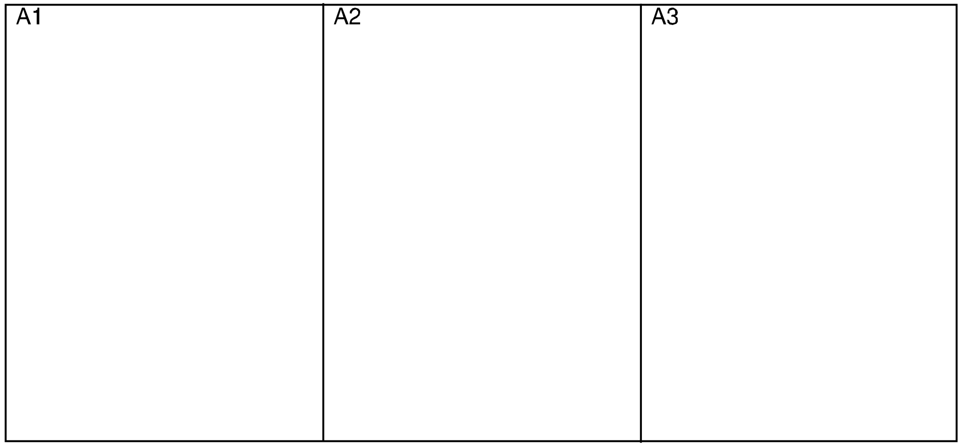
A3


IC103
LOGIC IC
IC3
A/D CONVERTER
IC4
D/A CONVERTER
IC2 (3/4)
IC104
RAM
IC301
8-BIT MICROCOMPUTER
IC303 (1/6),(2/6)
Q303
BUZZER CONT.
BZ301
BZ
Q302
IC101
CLOCK OSC
X101 18.432MHz
IC102
FF
CLK
IC304
P.ON RESET
X301 8MHz
IC302
AMP
IC303 (4/6)
IC5
+12V REG.
L.P.F
CLAMP
BRT CONTROL
CLAMP PULSE
BUFF
Q16
CURRENT REG DRIVE
Q11
Q12
TP1 VIN
TP2 VRT
TP3 VRB
TP4 D/A
TP7 HV
TP101 HD0
TP102 CLK
TP103 INTV
TP104 EXTV
D0-D5
DATA1-DATA16
DIO0-DIO17
DAD0-DAD8
THERMAL HEAD
CN102
THERMISTOR
CLOCK
ENABLE
B.E.O
LATCH
CN101
VH
CN51
+21V
+15V
+5V
+12V
POWER SUPPLY
CN304
LAMP (A)
CN521
GL520
LE-11 BOARD
CN303
PAPER (B)
PAPER (A)
CN501
Q501
Q502
PTC-35 BOARD
CN305
DOOR CLOSE
GND
MICRO SW
CN306
DOOR OPEN
HEAD UP
HEAD DOWN
TO POSITION PATTERN
SUM3
SE-9 BOARD
CN307
PRINT
COPY
DOOR OPEN
FL301
FILTER
CN301
R.SIG
DA/VIDEO
H/V
COPY KEY
LAMP (B)
PRINT KEY
DOOR KEY
EMPTY
Q301
SW
FRONT PANEL UNIT
ALARM BUZZER
EXTV
INTV
SO0
SCK0
MOTORSTART
REGSELECT
SIG.P.RESET
FETCH STOP
COPY STOP
FETCH
COPY
OR
STB
COPING
ERROR
RST
XTAL
EXTAL
HEAD TEMP
PAPERSENS B
PAPERSENS A
DOORCLOSESENS
DOOROPENSENS
HEADUPSENS
HEADDOWNSENS
PRINTMODE
EE/LOOP
COPYKEY
PRINTKEY
DOOROPENKEY
PAPEREMPTY
nCSYNC
nFG1
nFG2
NEGA
THCLK
DROUT
nSTBOUT
HD0
DCK1
EXTH
MCK
nINTV
SI
SCK
nRSTLD
REGSEL
nMREGRESET
nFETCSTOP
nFETCH
nCOPYSTOP
nCOPY
nPRI
nSTB
nCOPYING
HDERR
nCLR
DITH1
DITH0
AD10
AD15
DCK0
PWM0
PWM15
DIO0
DIO17
DAD0
DAD8
nWE
nOE
nCAS
nRAS
IO0
IO17
A0
A8
nUCAS
nLCAS
VIN
VRT
VRB
CK
VOUT
CLK
HDDA
CK01A
xT2A
xT1A
xTDA

PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

The following diagram has been devided into 3 sections as noted on the grid shown below.



4-3. PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS

MA-19 (MEMORY CONTROL, VIDEO, SYNC) SE-9 (POS. SENSOR) PTC-35 (PAPER SENSOR) SU-20 (PLATEN MOTOR) LE-11 (LAMP) C-

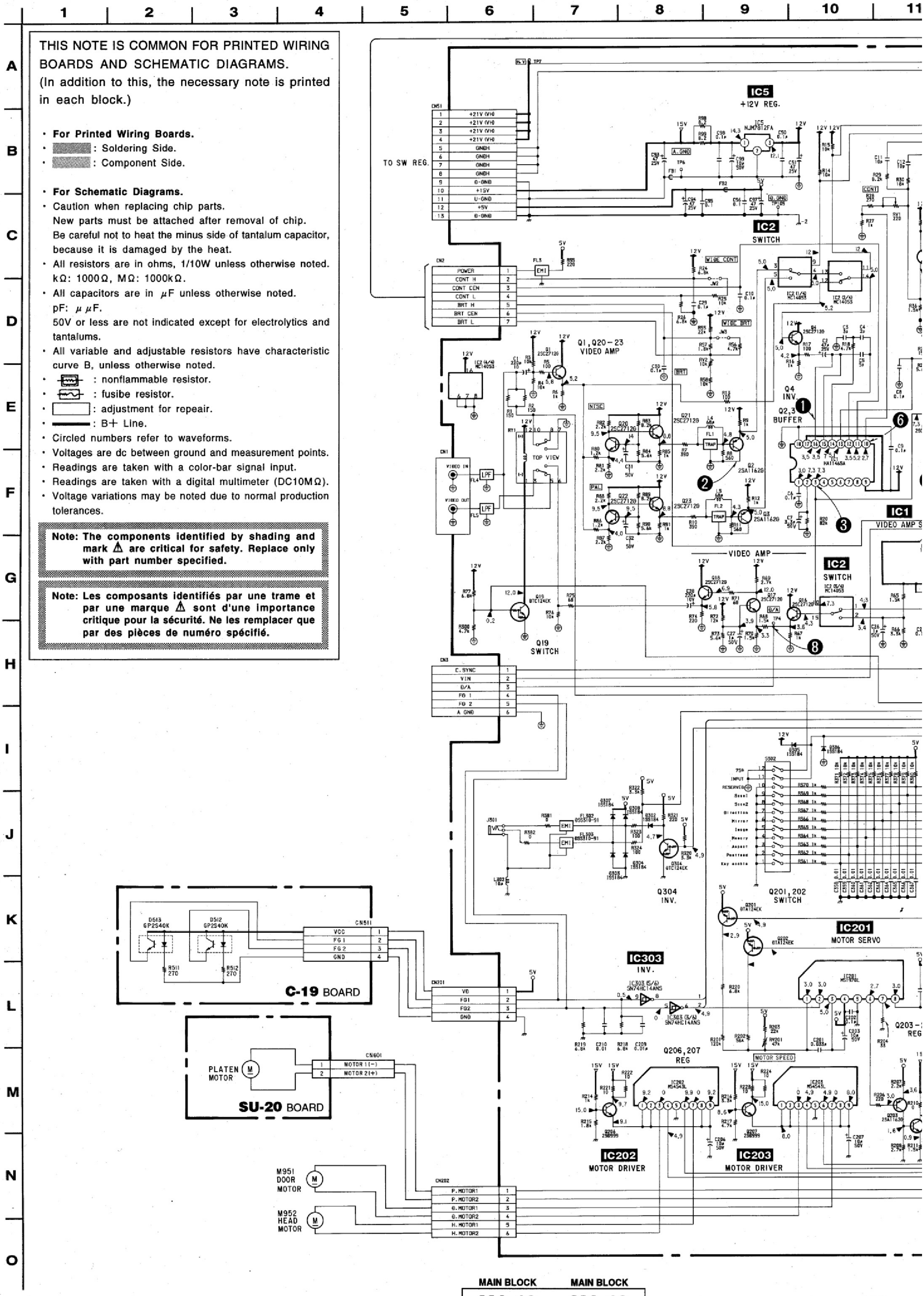
THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS.
(In addition to this, the necessary note is printed in each block.)

- **For Printed Wiring Boards.**
- ▨ : Soldering Side.
- ░ : Component Side.

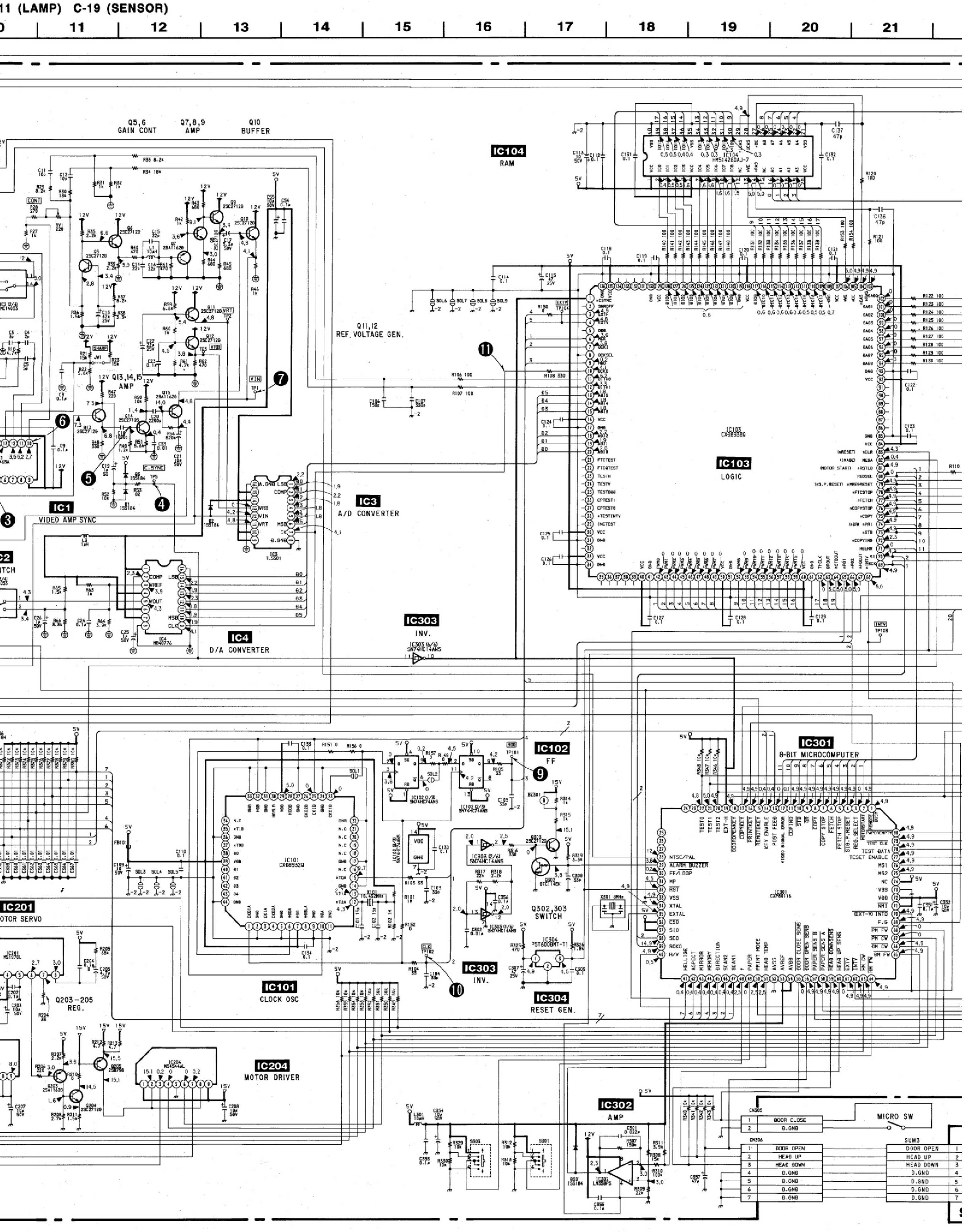
- **For Schematic Diagrams.**
- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the heat.
- All resistors are in ohms, 1/10W unless otherwise noted.
  kΩ: 1000Ω, MΩ: 1000kΩ.
- All capacitors are in μF unless otherwise noted.
  pF: μμF.
  50V or less are not indicated except for electrolytics and tantalums.
- All variable and adjustable resistors have characteristic curve B, unless otherwise noted.
- : nonflammable resistor.
- : fusible resistor.
- ▭ : adjustment for repeair.
- ▬ : B+ Line.
- Circled numbers refer to waveforms.
- Voltages are dc between ground and measurement points.
- Readings are taken with a color-bar signal input.
- Readings are taken with a digital multimeter (DC10MΩ).
- Voltage variations may be noted due to normal production tolerances.

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par une trame et par une marque ⚠ sont d'une importance critique pour la sécurité. Ne les remplacer que par des pièces de numéro spécifié.

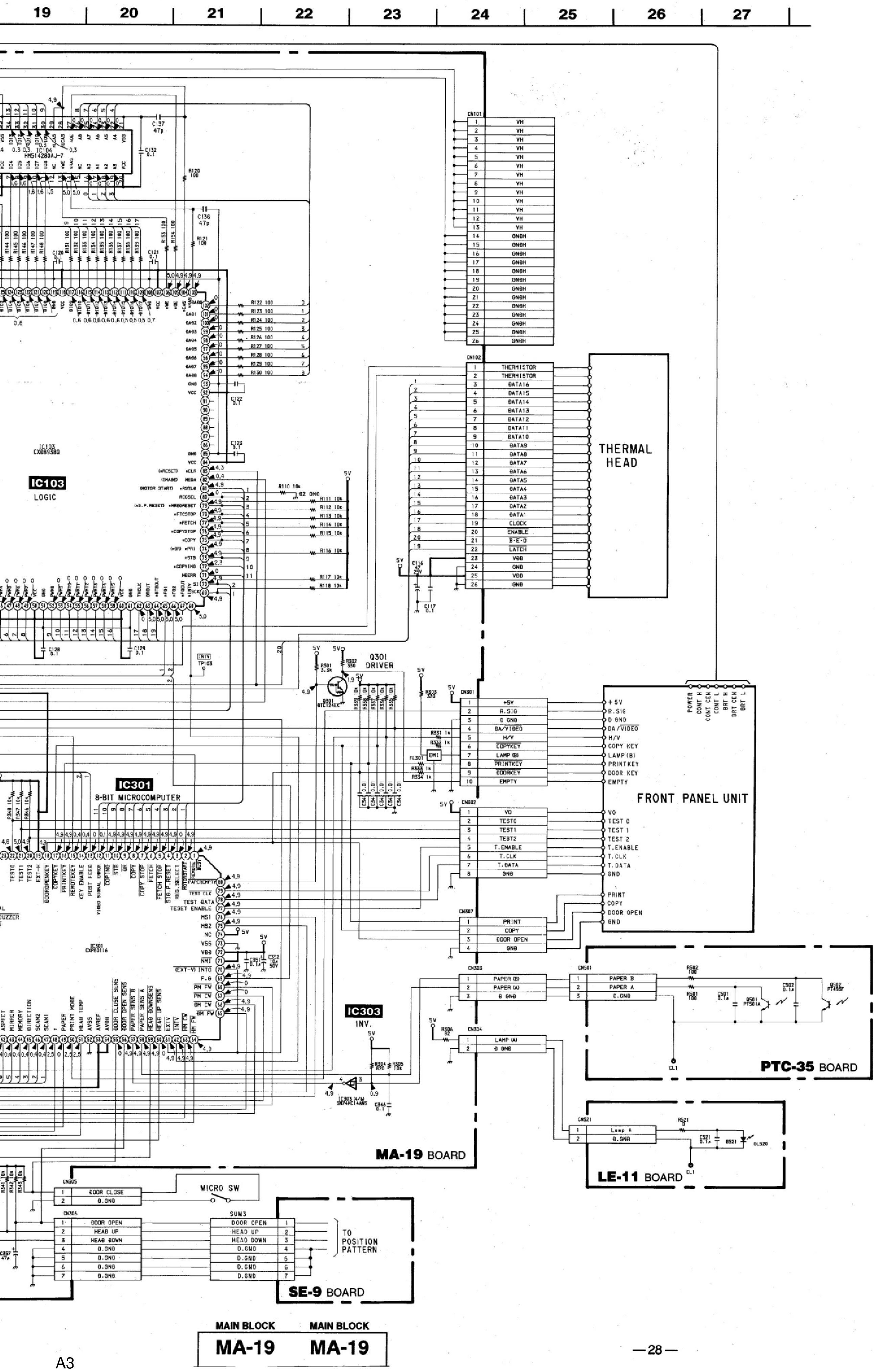

1
2
3
4
5
6
7
8
9
10
11
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
IC5
+12V REG.
NJM7812FA
CN51
+21V (VH)
GNDH
B-GND
+15V
U-GND
+5V
TO SW REG.
IC2
SWITCH
CN2
POWER
CONT H
CONT CEN
CONT L
BRT H
BRT CEN
BRT L
WIDE CONT
WIDE BRT
Q1, Q20-23
VIDEO AMP
Q4
INV.
Q2,3
BUFFER
NTSC
PAL
TOP VIEW
CN1
VIDEO IN
VIDEO OUT
LPF
TRAP
IC1
VIDEO AMP S
VIDEO AMP
HA11465A
Q19
SWITCH
CN3
C.SYNC
VIN
D/A
FG 1
FG 2
A GND
J301
Q304
INV.
Q201, 202
SWITCH
IC201
MOTOR SERVO
IC303
INV.
SN74HC14ANS
C-19 BOARD
D513
GP2S40K
D512
GP2S40K
CN511
VCC
FG1
FG2
GND
CN201
VD
FG1
FG2
GND
Q206, 207
REG
Q203
REG
MOTOR SPEED
PLATEN MOTOR
SU-20 BOARD
CN601
MOTOR 1(-)
MOTOR 2(+)
IC202
MOTOR DRIVER
IC203
MOTOR DRIVER
M54543L
M951
DOOR MOTOR
M952
HEAD MOTOR
CN202
P.MOTOR1
P.MOTOR2
D.MOTOR1
D.MOTOR2
H.MOTOR1
H.MOTOR2
TSP
INPUT
RESERVED
Scen1
Scen2
Direction
Mirror
Image
Memory
Aspect
Positive
Key enable

MAIN BLOCK **MA-19** **MAIN BLOCK** **MA-19**


11 (LAMP) C-19 (SENSOR)
11
12
13
14
15
16
17
18
19
20
21
Q5,6 GAIN CONT
Q7,8,9 AMP
Q10 BUFFER
IC104
RAM
HM514280AJ-7
IC103
LOGIC
CX08938Q
IC1
VIDEO AMP SYNC
IC3
A/D CONVERTER
TL5501
IC4
D/A CONVERTER
MB40776
Q11,12 REF. VOLTAGE GEN.
Q13,14,15 AMP
IC303
INV.
IC303 (4/6) SN74HC14ANS
IC102
FF
IC102 (1/3) SN74HC74ANS
IC102 (2/3) SN74HC74ANS
IC101
CLOCK OSC
CX08932Q
IC303
INV.
IC303 (2/6) SN74HC14ANS
IC303 (1/6) SN74HC14ANS
Q302,303 SWITCH
IC304
RESET GEN.
PST600DMT-T1
IC301
8-BIT MICROCOMPUTER
CXP80116
IC201
MOTOR SERVO
Q203-205 REG.
IC204
MOTOR DRIVER
IC302
AMP
LM358PS
DOOR CLOSE
D.GND
MICRO SW
DOOR OPEN
HEAD UP
HEAD DOWN
D.GND
D.GND
D.GND
DOOR OPEN
HEAD UP
HEAD DOWN
D.GND
D.GND
D.GND
D.GND
NTSC/PAL
ALARM BUZZER
EE/LOOP
TEST CLK
TEST DATA
TESET ENABLE
EXT-V INTO
VIN
VRT
VRB
C.SYNC
CONT
SHARP
CLK
INTV
HDD
EXTV
1
2
3
4
5
6
7
8
9
10
11

MAIN BLOCK

MA-19


19
20
21
22
23
24
25
26
27
IC104 HM514280AJ-7
IC103
LOGIC
IC103 CXD8938Q
IC301
8-BIT MICROCOMPUTER
IC301 CXP80116
IC303
INV.
IC303 (4/6) SN74HC14ANS
Q301
DRIVER
CN101
VH
GNDH
CN102
THERMISTOR
DATA16
DATA15
DATA14
DATA13
DATA12
DATA11
DATA10
DATA9
DATA8
DATA7
DATA6
DATA5
DATA4
DATA3
DATA2
DATA1
CLOCK
ENABLE
B-E-O
LATCH
VDD
GND
THERMAL HEAD
CN301
+5V
R.SIG
D GND
DA/VIDEO
H/V
COPYKEY
LAMP (B)
PRINTKEY
DOORKEY
EMPTY
CN302
VD
TEST0
TEST1
TEST2
T.ENABLE
T.CLK
T.DATA
GND
CN307
PRINT
COPY
DOOR OPEN
FRONT PANEL UNIT
POWER
CONT H
CONT CEN
CONT L
BRT H
BRT CEN
BRT L
CN303
PAPER (B)
PAPER (A)
D GND
CN501
PAPER B
PAPER A
D.GND
Q501 PT501A
Q502 PT455F
PTC-35 BOARD
CN304
LAMP (A)
D GND
CN521
Lamp A
D.GND
D521
GL520
LE-11 BOARD
MA-19 BOARD
CN305
DOOR CLOSE
D.GND
MICRO SW
CN306
DOOR OPEN
HEAD UP
HEAD DOWN
D.GND
SUM3
TO POSITION PATTERN
SE-9 BOARD
BUZZER

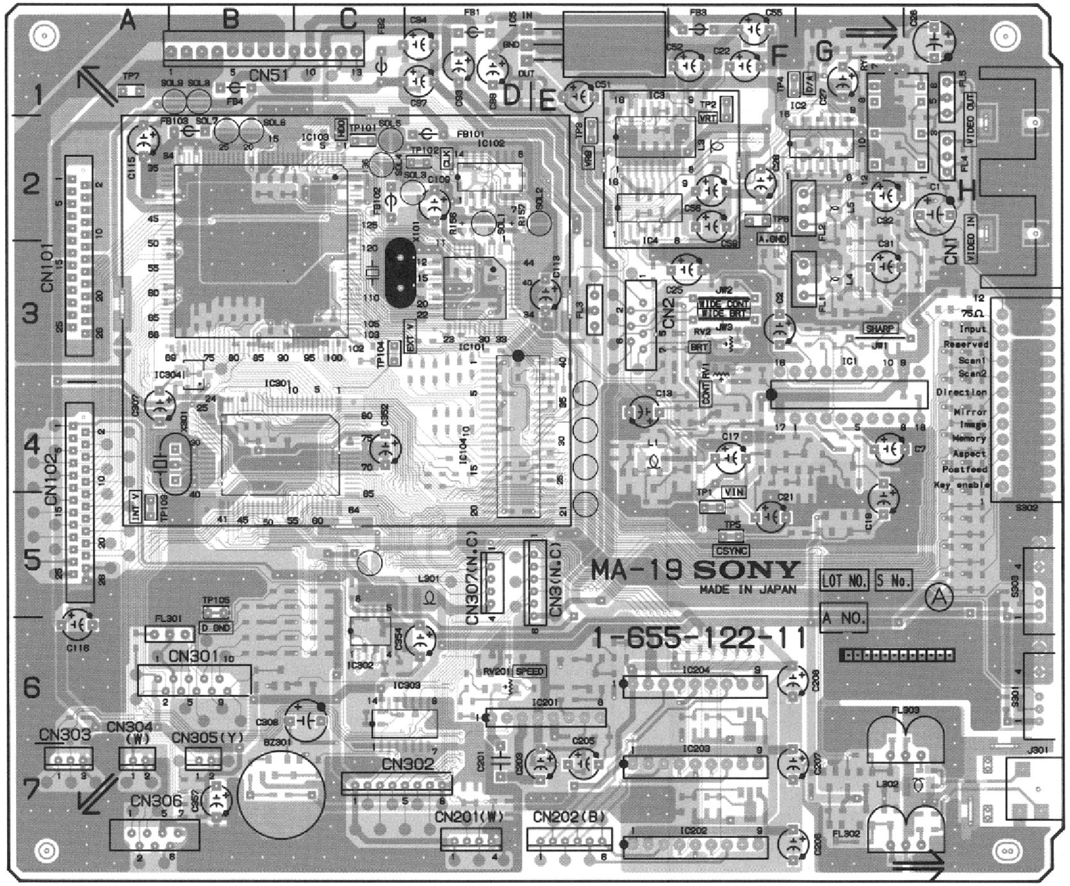
MAIN BLOCK **MA-19** MAIN BLOCK **MA-19**

MA-19 (MEMORY CONTROL, VIDEO, SYNC) SE-9 (POS. SENSOR) PTC-35 (PAPER SENSOR) SU-20 (PLATEN MOTOR) LE-11 (LAMP) C-19 (SENSOR)

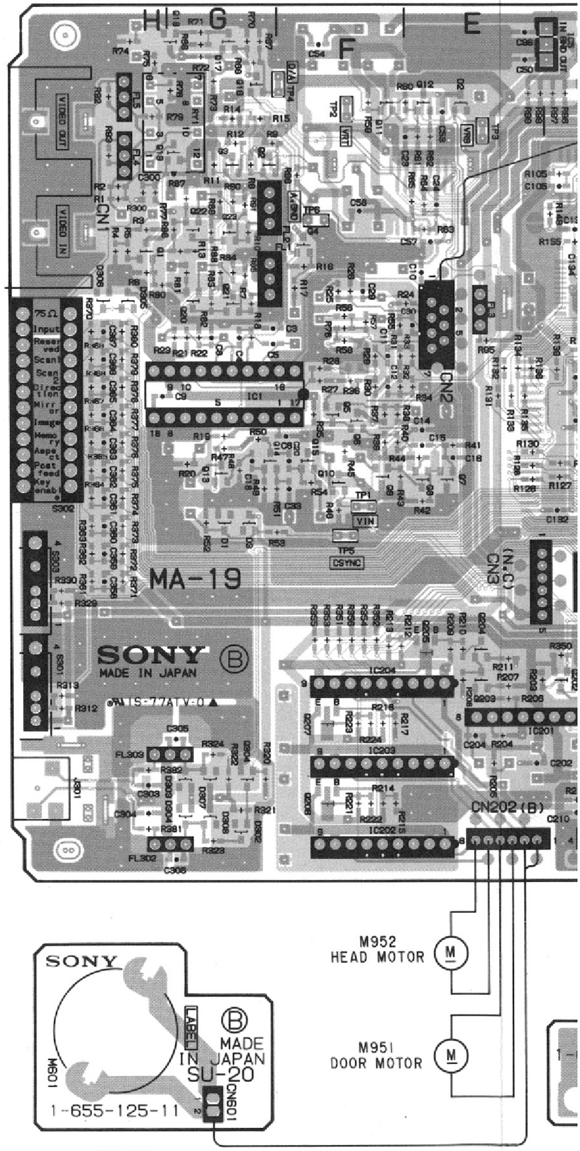
MA-19 BOARD

BZ301	B-7	
CN1	H-2	
CN2	E-3	
CN3	E-5	
CN101	A-3	
CN102	A-5	
CN201	D-7	
CN202	E-7	
CN301	B-6	
CN302	C-7	
CN303	A-7	
CN304	A-7	
CN305	B-7	
CN306	A-7	
CN307	D-5	
D1	G-5	S
D2	E-1	S
D3	G-5	S
D301	C-6	S
D302	G-7	S
D303	G-7	S
D304	G-7	S
D305	H-3	S
D306	H-3	S
D307	G-7	S
D308	G-7	S
FB1	D-1	
FB2	C-1	
FB3	F-1	
FB4	B-1	
FB101	D-2	
FL1	G-3	
FL2	G-2	
FL3	E-3	
FL4	H-2	
FL5	H-1	
FL301	A-6	
FL302	G-7	
FL303	G-6	
IC1	G-4	
IC2	G-2	
IC5	D-1	
IC101	D-3	
IC102	D-2	
IC103	B-3	
IC104	D-4	
IC201	E-6	
IC202	F-7	
IC203	F-7	
IC204	F-6	
IC301	B-4	
IC302	C-6	
IC303	C-6	
IC304	B-3	
J301	H-7	
L1	E-4	
L3	F-2	
L4	G-3	
L5	G-2	
L301	D-5	
L302	H-7	
Q1	H-3	S
Q2	G-2	S
Q3	G-2	S
Q4	F-3	S
Q5	F-4	S
Q6	F-4	S
Q7	E-4	S
Q8	E-4	S
Q9	F-4	S
Q10	F-4	S
Q11	F-1	S
Q12	E-1	S
Q13	G-4	S
Q14	G-4	S
Q15	F-4	S
Q16	G-1	S
Q17	G-1	S
Q18	G-1	S
Q19	G-2	S
Q20	G-3	S
Q21	G-3	S
Q22	G-2	S
Q23	G-2	S
Q201	D-6	S
Q202	D-6	S
Q203	E-6	S
Q204	E-6	S
Q205	E-6	S
Q206	F-7	S
Q207	F-6	S
Q301	B-6	S
Q302	B-7	S
Q303	B-7	S
Q304	G-7	S
RV1	F-3	
RV2	F-3	
RV201	D-6	
RY1	G-1	
S301	H-6	
S302	H-4	
S303	H-4	
X101	C-3	
X301	B-4	

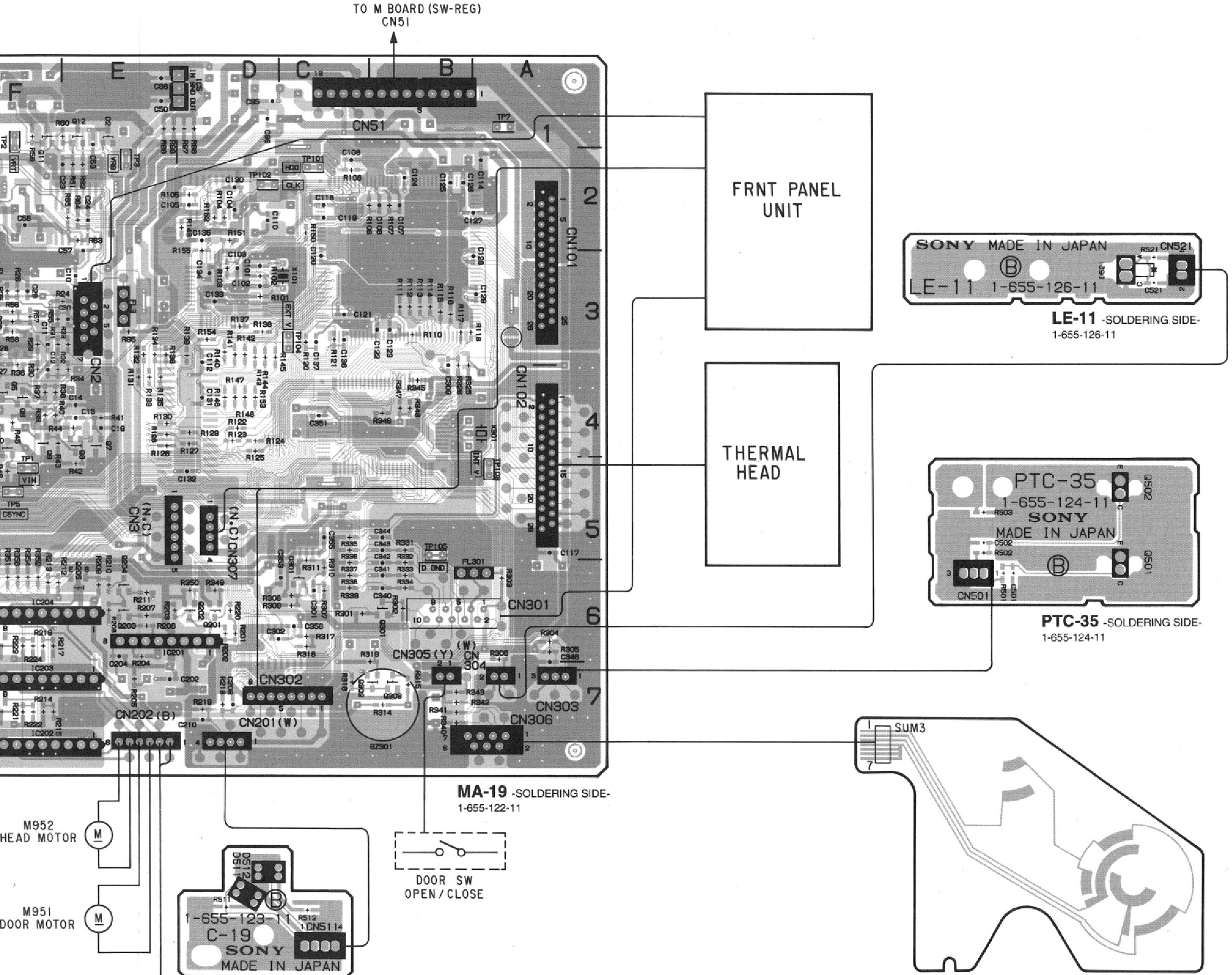
S:SOLDERING SIDE


A
B
C
D
E
F
G
H
1
2
3
4
5
6
7
CN101
CN102
CN51
CN1
CN2
CN3(N.C)
CN307(N.C)
CN301
CN302
CN303
CN304 (W)
CN305(Y)
CN306
CN201(W)
CN202(B)
VIDEO IN
VIDEO OUT
MA-19 SONY
MADE IN JAPAN
1-655-122-11
LOT NO.
S No.
A NO.
Ⓐ

MA-19 -COMPONENT SIDE-
1-655-122-11


H
G
F
E
MA-19
SONY
MADE IN JAPAN
Ⓑ
CN3 (N.C)
CN2
CN1
CN202(B)
M952
HEAD MOTOR
M951
DOOR MOTOR
SONY
M601
LABEL
Ⓑ
MADE IN JAPAN
SU-20
CN601
1-655-125-11

SU-20 -SOLDERING SIDE-
1-655-125-11


TO M BOARD (SW-REG)
CN51
A
B
C
D
E
F
1
2
3
4
5
6
7
CN51
CN101
CN102
CN2
CN3 (N.C)
(N.C)CN307
CN301
CN302
CN303
CN304
CN305 (Y) (W)
CN306
CN201 (W)
CN202 (B)
FRNT PANEL UNIT
THERMAL HEAD
M952 HEAD MOTOR
M951 DOOR MOTOR
DOOR SW OPEN / CLOSE
SONY MADE IN JAPAN
LE-11 1-655-126-11
CN521
PTC-35
1-655-124-11
SONY
MADE IN JAPAN
CN501
Q501
Q502
SUM3
1-655-123-11
C-19
SONY
MADE IN JAPAN
CN5114
D511
D512

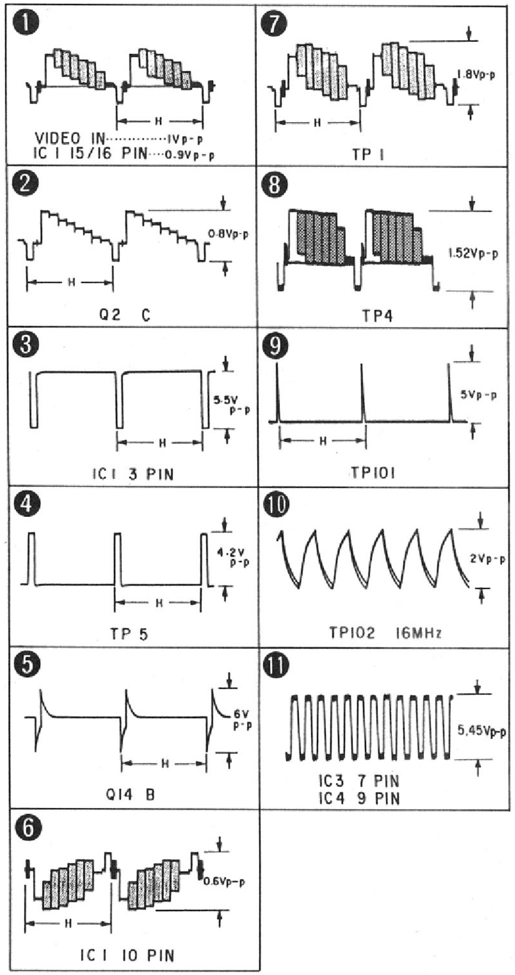
MA-19 -SOLDERING SIDE-
1-655-122-11

C-19 -SOLDERING SIDE-
1-655-123-11

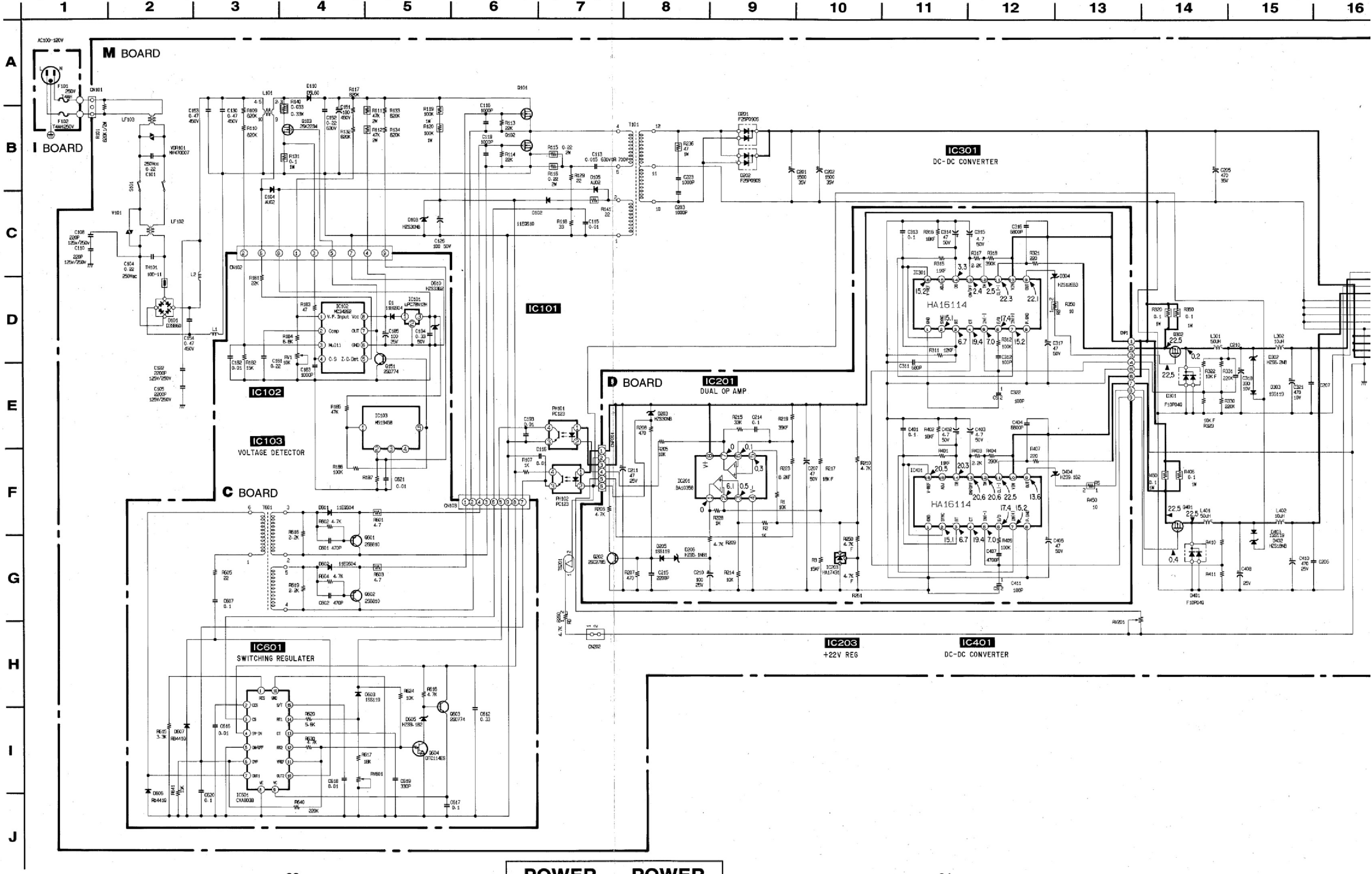
LE-11 -SOLDERING SIDE-
1-655-126-11

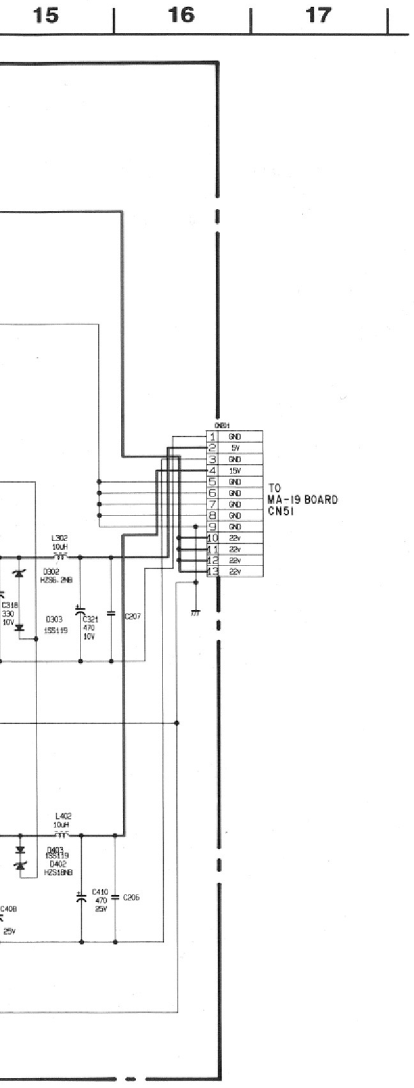
PTC-35 -SOLDERING SIDE-
1-655-124-11

SE-9 -SOLDERING SIDE-
1-641-592-11

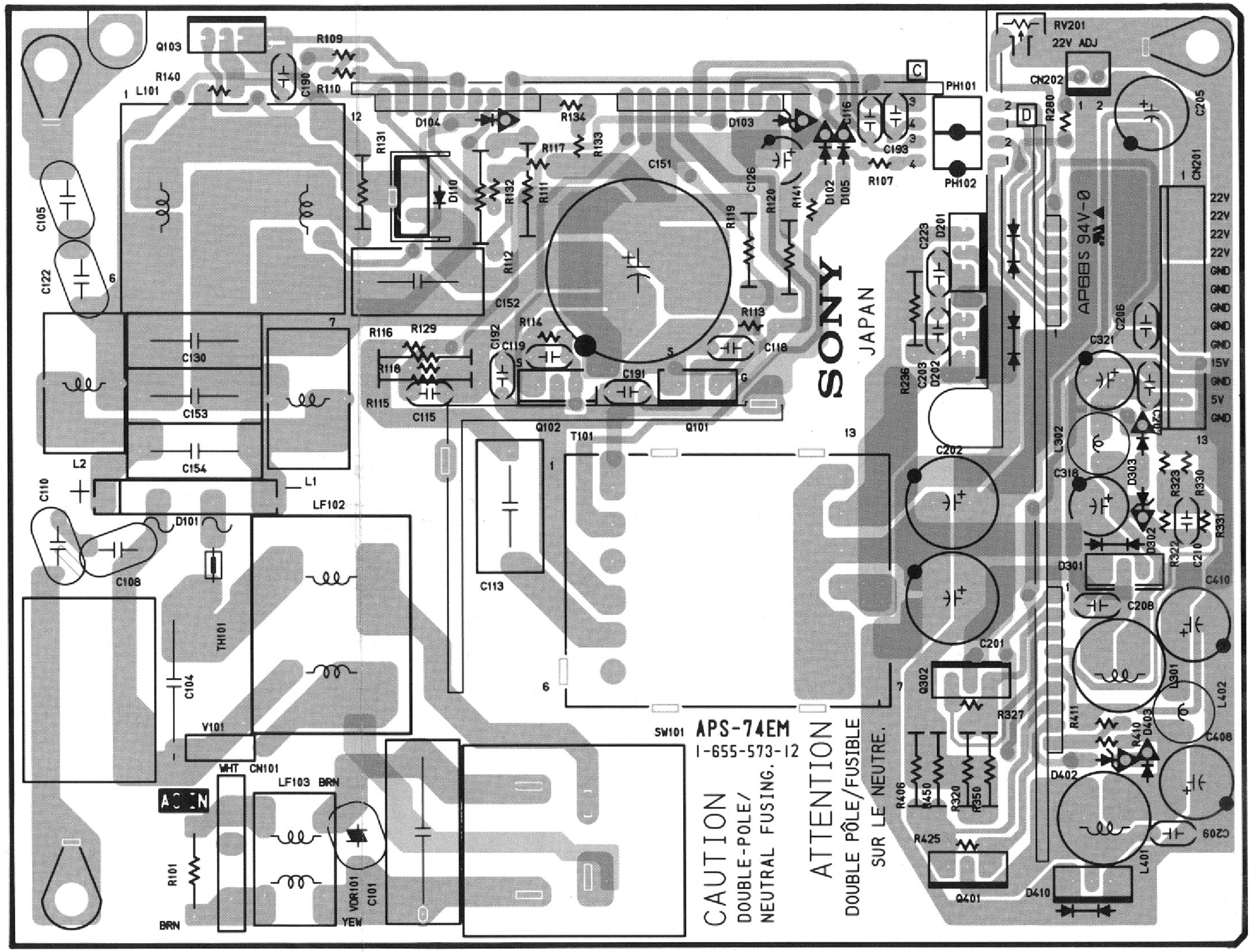


M (POWER SUPPLY) C (SWITCHING REGULATOR) D (DC-DC CONVERTER) I (AC IN)


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
A
B
C
D
E
F
G
H
I
J
AC100~120V
M BOARD
I BOARD
C BOARD
D BOARD
IC101
IC102
IC103
VOLTAGE DETECTOR
IC201
DUAL OP AMP
IC203
+22V REG
IC301
DC-DC CONVERTER
IC401
DC-DC CONVERTER
IC601
SWITCHING REGULATER
HA16114
HA16114
MC34262
BA10358
CXA8038
T101
T601
CN101
CN102
CN103
CN202
DN201
PH101
PC123
PH102
PC123
TS201

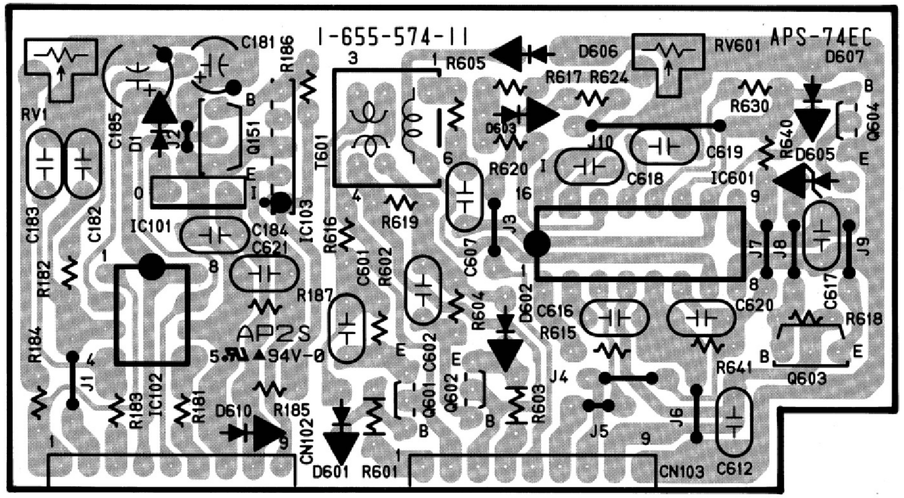

15
16
17
CN51
1 GND
2 5V
3 GND
4 15V
5 GND
6 GND
7 GND
8 GND
9 GND
10 22V
11 22V
12 22V
13 22V
TO
MA-19 BOARD
CN51
L302
10uH
D302
HZS6-2NB
C318
330
10V
D303
1SS119
C321
470
10V
C207
L402
10uH
D403
1SS119
D402
HZS18NB
C410
470
25V
C206
C408
25V

M (POWER SUPPLY)

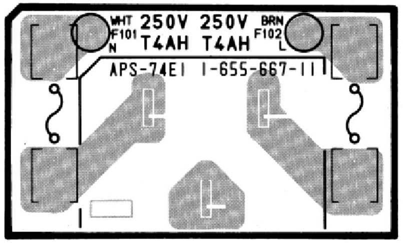

Q103
R109
R140
L101
C190
R110
12
R131
D104
R134
R117
R133
D110
R132
R111
R112
C151
D103
C116
C193
R107
R119
R120
R141
D102
D105
C126
C105
C122
6
C130
C153
C154
7
R116
R129
R118
R115
C115
C152
R114
C192
C119
C191
R113
C118
Q102
Q101
T101
L2
L1
LF102
C110
D101
C108
C113
TH101
C104
V101
WHT
CN101
LF103
BRN
AC IN
R101
BRN
VDR101
C101
YEW
SW101
APS-74EM
1-655-573-12
CAUTION
DOUBLE-POLE/
NEUTRAL FUSING.
ATTENTION
DOUBLE PÔLE/FUSIBLE
SUR LE NEUTRE.
SONY
JAPAN
13
6
7
R236
C203
D202
C223
D201
C202
C201
Q302
R327
R406
R450
R320
R350
R425
Q401
D410
L401
D402
R411
R410
D403
C209
C408
L402
L301
C410
C208
D301
C318
L302
D303
D302
R322
C210
R323
R330
R331
C321
C206
APBBS 94V-0
CN201
1
22V
22V
22V
22V
GND
GND
GND
GND
GND
15V
GND
5V
GND
13
C205
CN202
R280
RV201
22V ADJ
PH101
PH102
C
D

M -SOLDERING SIDE-
1-655-573-12

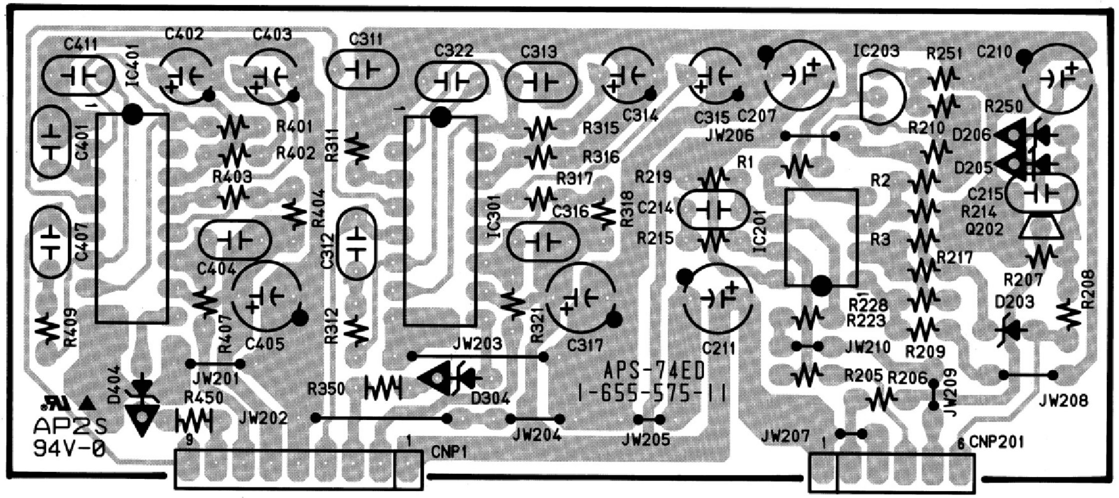
C (SWITCHING REGULATOR) D (DC-DC CONVERTER) I (AC IN)


1-655-574-11
APS-74EC
RV1
C181
C182
C183
C184
C185
D1
J2
Q151
R186
T601
R605
D606
R617 R624
RV601
D607
R630
Q604
D603
J10
C619
R640
D605
R620
C618
IC601
IC101
IC103
R616
R619
C607
J3
J7
J8
J9
C617
R182
R184
C621
R187
C601
R602
R604
D602
C616
R615
C620
R618
AP2S
94V-0
R641
Q603
J1
R183
IC102
R181
D610
R185
CN102
Q601
C602
Q602
R603
J4
J5
J6
D601
R601
CN103
C612

C -SOLDERING SIDE-
1-655-574-11


WHT
F101
N
250V 250V
T4AH T4AH
BRN
F102
L
APS-74EI 1-655-667-11

I -SOLDERING SIDE-
1-655-667-11


C411
IC401
C402
C403
C311
C322
C313
IC203
R251
C210
C401
R401
R402
R403
R404
R311
R315
R316
R317
C314
C315 C207
JW206
R1
R250
R210
D206
D205
C215
R214
Q202
C407
C404
C312
IC301
C316
R318
R219
C214
R215
IC201
R2
R3
R217
R207
D203
R208
R409
R407
C405
R312
R321
C317
C211
R228
R223
JW210
R209
JW203
D404
JW201
R450
R350
D304
APS-74ED
1-655-575-11
R205 R206
JW209
JW208
AP2S
94V-0
JW202
JW204
JW205
JW207
CNP1
CNP201

D -SOLDERING SIDE-
1-655-575-11

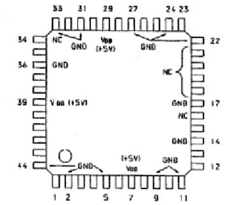
4-4. SEMICONDUCTORS

The chart in this section may sometimes show diodes, transistors, and ICs that are not interchangeable. When replacing a component, be sure to refer to the parts list. The circuit diagram of each IC is obtained from the IC data book published by the manufacturer.

TYPE	PAGE	TYPE	PAGE
1SS184	45	CXD8932Q	40
2SA1162-G	45	CXD8938Q	40
2SB798-DL	45	CXP80P116Q-2-EXP030	41
2SC2712-YG	45	HA11465A	42
2SD999-CLCK	45	HD14053BFP	42
DTA124EK	45	HM514280AJ-7	42
DTC114EK	45	LM358PS	42
DTC124EK	45	M51970L	43
GL-520	45	M54543L	43
GP2S40K	45	M54544AL	43
PT493F	45	MB40776PF	43
PT501A	45	PST523C	44
		SN74HC14ANS	44
		SN74HC74ANS	44
		TA7812S	44

CXD8932Q (SONY)

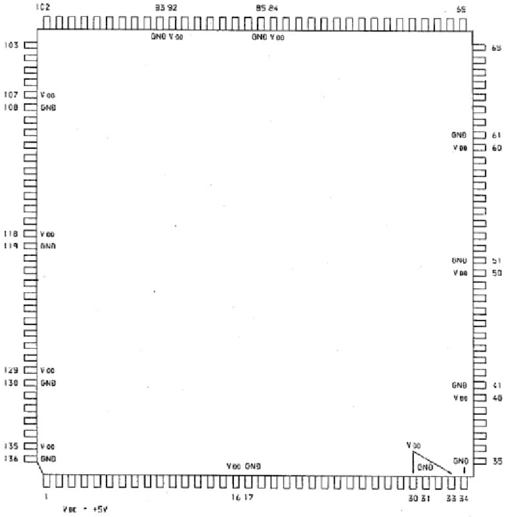
CLOCK OSC
—TOP VIEW—


33 31 29 27 24 23
34
36
39
44
22
17
14
12
1 2 5 7 9 11
NC
VDD (+5V)
GND
GND
NC
GND
VDD (+5V)
GND
NC
GND
GND
(+5V) VDD
GND

PIN No.	I/O	SIGNAL	PIN No.	I/O	SIGNAL
1	O	CKO1A	23	O	CKO1B
2	—	GND	24	—	GND
3	I	CKIA	25	I	CKIB
4	O	CKO2A	26	O	CKO2B
5	—	GND	27	—	GND
6	O	HDOA	28	O	HDOB
7	—	VDD	29	—	VDD
8	I	HDSLA	30	I	HDSLB
9	—	GND	31	—	GND
10	I	HDA	32	I	HDB
11	—	GND	33	—	GND
12	O	XT2A	34	—	N.C.
13	I	XT1A	35	I	XT1B
14	—	GND	36	—	GND
15	O	XTOA	37	O	XTOB
16	—	N.C.	38	I	D0
17	—	GND	39	—	VDD
18	—	N.C.	40	I	D1
19	—	N.C.	41	I	D2
20	—	N.C.	42	I	D3
21	—	N.C.	43	I	D4
22	—	GND	44	—	GND

CXD8938Q (SONY)

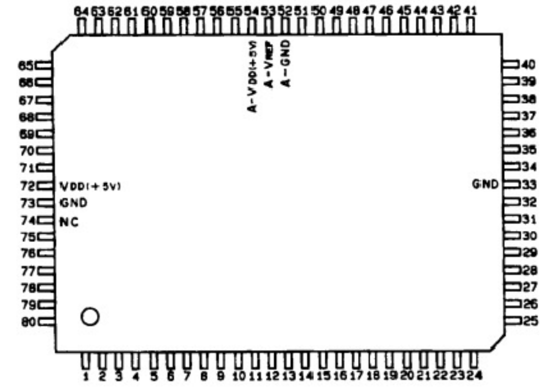
CELL BASE IC
—TOP VIEW—


102
93 92
85 84
69
103
65
107 VDD
108 GND
GND VDD
GND VDD
GND 61
VDD 60
118 VDD
119 GND
GND 51
VDD 50
129 VDD
130 GND
GND 41
VDD 40
135 VDD
136 GND
VDD
GND
GND 35
VDD GND
1
16 17
30 31
33 34
VDD = +5V

PIN No.	I/O	SIGNAL	PIN No.	I/O	SIGNAL	PIN No.	I/O	SIGNAL	PIN No.	I/O	SIGNAL
1	I	*CSYNC	35	O	SHTEST	69	I	SCK	103	O	*RAS
2	I	SNROFF	36	I	tCS3	70	I	SI	104	O	*CAS
3	O	EXTH	37	I	tCS2	71	O	HDERR	105	O	*OE
4	O	EXTV	38	I	tCS1	72	O	*COPYING	106	O	*WE
5	O	ODD	39	I	tCS0	73	I	*STB	107	—	VDD
6	I	MCK	40	—	VDD	74	I	BRI	108	—	GND
7	I	BCKI	41	—	GND	75	I	*COPY	109	O	DIO17
8	I	BCKSEL	42	O	PWM0	76	I	*COPYSTOP	110	O	DIO16
9	I	HBD	43	O	PWM1	77	I	*FETCH	111	O	DIO15
10	O	BCKO	44	O	PWM2	78	I	*FTCSTOP	112	O	DIO14
11	O	DITH0	45	O	PWM3	79	I	*MRCORCSCT	113	O	DIO13
12	O	DITH1	46	O	PWM4	80	I	REGSEL	114	O	DIO12
13	I	AD15	47	O	PWM5	81	I	*RSTLD	115	O	DIO11
14	I	AD14	48	O	PWM6	82	I	NEGA	116	O	DIO10
15	I	AD13	49	O	PWM7	83	I	*CLR	117	O	DIO9
16	—	VDD	50	—	VDD	84	—	VDC	118	—	VDD
17	—	GND	51	—	GND	85	—	GND	119	—	GND
18	I	AD12	52	O	PWM8	86	I	tAD5	120	O	DIO8
19	I	AD11	53	O	PWM9	87	I	tAD4	121	O	DIO7
20	I	AD10	54	O	PWM10	88	I	tAD3	122	O	DIO6
21	I	FTCTEST	55	O	PWM11	89	I	tAD2	123	O	DIO5
22	I	FTCDTEST	56	O	PWM12	90	I	tAD1	124	O	DIO4
23	I	TESTH	57	O	PWM13	91	I	tAD0	125	O	DIO3
24	I	TESTV	58	O	PWM14	92	—	VDD	126	O	DIO2
25	I	TESTODD	59	O	PWM15	93	—	GND	127	O	DIO1
26	I	CPTEST1	60	—	VDD	94	O	DAD8	128	O	DIO0
27	I	CPTEST0	61	—	GND	95	O	DAD7	129	—	VDD
28	I	*TESTINTV	62	O	THCK	96	O	DAD6	130	—	GND
29	I	ISNCTEST	63	O	BRDUT	97	O	DAD5	131	I	tWE
30	—	VDD	64	O	*STBOUT	98	O	DAD4	132	I	tOE
31	—	GND	65	I	*FG1	99	O	DAD3	133	I	tRW
32	I	RAMTEST	66	I	*FG2	100	O	DAD2	134	I	tLCSEL
33	—	VDD	67	O	*FGOUT	101	O	DAD1	135	—	VDD
34	—	GND	68	O	*INTV	102	O	DAD0	136	—	GND

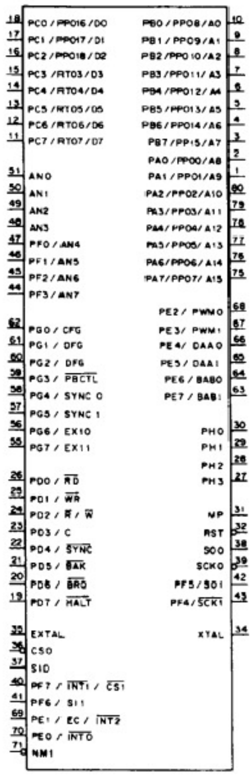
CXP80P116Q-2-EXP030

C-MOS 8-BIT MICROCOMPUTER
—TOP VIEW—


64 63 62 61 60 59 58 57 56 55 54 53 52 51 50 49 48 47 46 45 44 43 42 41
A-VDD(+5V)
A-VREF
A-GND
65
66
67
68
69
70
71
72 VDD(+5V)
73 GND
74 NC
75
76
77
78
79
80
40
39
38
37
36
35
34
GND 33
32
31
30
29
28
27
26
25
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

(V_{DD} = + 5V)

PIN NO.	I/O	SYMBOL	PIN NO.	I/O	SYMBOL
1	O	PA1/PPO1/A9	41	I	PF6/SI1
2	O	PA0/PPO0/A8	42	I/O	PF5/SO1
3	O	PB7/PPO15/A7	43	I,I/O	PF4/$\overline{\text{SCK1}}$
4	O	PB6/PPO14/A6	44	I	PF3/AN7
5	O	PB5/PPO13/A5	45	I	PF2/AN6
6	O	PB4/PPO12/A4	46	I	PF1/AN5
7	O	PB3/PPO11/A3	47	I	PF0/AN4
8	O	PB2/PPO10/A2	48	I	AN3
9	O	PB1/PPO9/A1	49	I	AN2
10	O	PB0/PPO8/A0	50	I	AN1
11	I/O,O,I/O	PC7/RTO7/D7	51	I	AN0
12	I/O,O,I/O	PC6/RTO6/D6	52	–	A-GND
13	I/O,O,I/O	PC5/RTO5/D5	53	–	A-V_{REF}
14	I/O,O,I/O	PC4/RTO4/D4	54	–	A-V_{DD}
15	I/O,O,I/O	PC3/RTO3/D3	55	I	PG7/EXI1
16	I/O,O,I/O	PC2/PPO18/D2	56	I	PG6/EXI0
17	I/O,O,I/O	PC1/PPO17/D1	57	I	PG5/SYNC1
18	I/O,O,I/O	PC0/PPO16/D0	58	I	PG4/SYNC0
19	I/O,O	PD7/$\overline{\text{HALT}}$	59	I	PG3/$\overline{\text{PBCTL}}$
20	I/O,O	PD6/$\overline{\text{BRQ}}$	60	I	PG2/DPG
21	I/O,O	PD5/$\overline{\text{BAK}}$	61	I	PG1/DFG
22	I/O,O	PD4/$\overline{\text{SYNC}}$	62	I	PG0/CFG
23	I/O,O	PD3/C	63	O	PE7/DAB1
24	I/O,O	PD2/R/$\overline{\text{W}}$	64	O	PE6/DAB0
25	I/O,O	PD1/$\overline{\text{WR}}$	65	O	PE5/DAA1
26	I/O,O	PD0/$\overline{\text{RD}}$	66	O	PE4/DAA0
27	O	PH3	67	O	PE3/PWM1
28	O	PH2	68	O	PE2/PWM0
29	O	PH1	69	I	PE1/$\overline{\text{EC}}$/$\overline{\text{INT2}}$
30	O	PH0	70	I	PE0/$\overline{\text{INT0}}$
31	I	MP	71	I	$\overline{\text{NMI}}$
32	I/O	RST	72	–	V_{DD}
33	–	GND	73	–	GND
34	O	XTAL	74	–	NC
35	I	EXTAL	75	O	PA7/PPO7/A15
36	I	CS0	76	O	PA6/PPO6/A14
37	I	SI0	77	O	PA5/PPO5/A13
38	O	SO0	78	O	PA4/PPO4/A12
39	I/O	SCK0	79	O	PA3/PPO3/A11
40	I	PF7/$\overline{\text{INT1}}$/$\overline{\text{CS1}}$	80	O	PA2/PPO2/A10


18 PC0 / PPO16 / D0
17 PC1 / PPO17 / D1
16 PC2 / PPO18 / D2
15 PC3 / RTO3 / D3
14 PC4 / RTO4 / D4
13 PC5 / RTO5 / D5
12 PC6 / RTO6 / D6
11 PC7 / RTO7 / D7
51 AN0
50 AN1
49 AN2
48 AN3
47 PF0 / AN4
46 PF1 / AN5
45 PF2 / AN6
44 PF3 / AN7
62 PG0 / CFG
61 PG1 / DFG
60 PG2 / DPG
59 PG3 / PBCTL
58 PG4 / SYNC 0
57 PG5 / SYNC 1
56 PG6 / EXI0
55 PG7 / EXI1
26 PD0 / RD
25 PD1 / WR
24 PD2 / R / W
23 PD3 / C
22 PD4 / SYNC
21 PD5 / BAK
20 PD6 / BRQ
19 PD7 / HALT
35 EXTAL
36 CS0
37 SI0
40 PF7 / INT1 / CS1
41 PF6 / SI1
69 PE1 / EC / INT2
70 PE0 / INT0
71 NMI
PB0 / PPO8 / A0 10
PB1 / PPO9 / A1 9
PB2 / PPO10 / A2 8
PB3 / PPO11 / A3 7
PB4 / PPO12 / A4 6
PB5 / PPO13 / A5 5
PB6 / PPO14 / A6 4
PB7 / PPO15 / A7 3
PA0 / PPO0 / A8 2
PA1 / PPO1 / A9 1
PA2 / PPO2 / A10 80
PA3 / PPO3 / A11 79
PA4 / PPO4 / A12 78
PA5 / PPO5 / A13 77
PA6 / PPO6 / A14 76
PA7 / PPO7 / A15 75
PE2 / PWM0 68
PE3 / PWM1 67
PE4 / DAA0 66
PE5 / DAA1 65
PE6 / DAB0 64
PE7 / DAB1 63
PH0 30
PH1 29
PH2 28
PH3 27
MP 31
RST 32
SO0 38
SCK0 39
PF5 / SO1 42
PF4 / SCK1 43
XTAL 34

INPUT

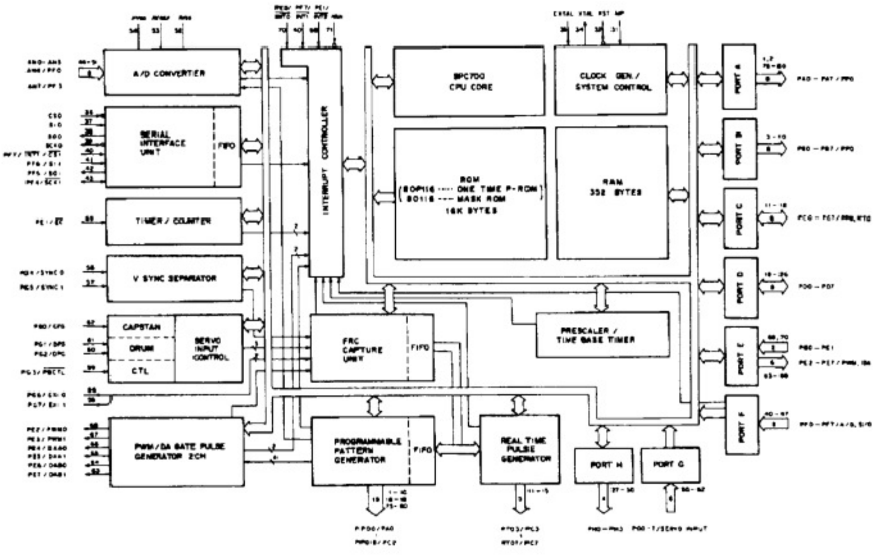
AN0 – AN7	: ANALOG INPUTS
BRQ	: BUS REQUEST INPUT
CFG	: CAPSTAN FG INPUT
CS0,1	: CHIP SELECT INPUTS
DFG	: DRUM FG INPUT
DPG	: DRUM PG INPUT
EC	: EVENT INPUT
EXI0,1	: EXTERNAL INPUTS
EXTAL	: SYSTEM CLOCK GENERATE JOINT
HALT	: CPU STOP INPUT
INT0 – INT2	: EXTERNAL OFFERING INPUTS
MP	: MICRO PROSESSOR MODE INPUT
NMI	: NONMASKABLE OFFERING INPUT
PBCTL	: PB CTL PULSE INPUT
PE0,1	: PORT E INPUTS
PF0 – PF7	: PORT F INPUTS
PG0 – PG7	: PORT G INPUTS
SI0,1	: SERIAL DATA INPUTS
SYNC0,1	: COMPOSITE SYNC INPUTS

OUTPUT

A0 – A15	: ADDRESS BUS OUTPUTS
BAK	: BUS ACKNOWLEGE OUTPUT
C	: TIMING SIGNAL OUTPUT
DAA0,1	: DA GATE PULSE OUTPUTS
DAB0,1	: DA GATE PULSE OUTPUTS
PA0 – PA7	: PORT A OUTPUTS
PB0 – PB7	: PORT B OUTPUTS
PE2 – PE7	: PORT E OUTPUTS
PH0 – PH3	: PORT H OUTPUTS
PPO0 – PPO18	: PROGRAMMABLE PATTERN GENERATOR OUTPUTS
PWM0,1	: PWM OUTPUTS
R/W	: CPU MACHINE SYCLE
RD	: READ
RTO3 – RTO7	: REAL TIME PULSE OUTPUTS
SO0,1	: SERIAL DATA OUTPUTS
SYNC	: SYNC
WR	: WRITE
XTAL	: SYSTEM CLOCK GENERATER OUTPUT

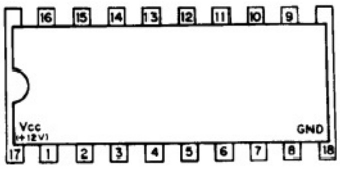
INPUT/OUTPUT

D0 – D7	: DATA BUS
PC0 – PC7	: PORT C
PD0 – PD7	: PORT D
RST	: RESET
SCK0,1	: SERIAL CLOCK

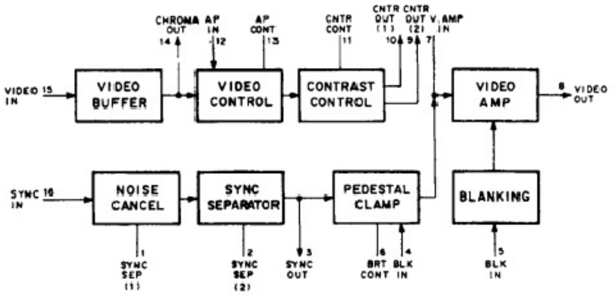

A/D CONVERTER
SERIAL INTERFACE UNIT
FIFO
TIMER / COUNTER
V SYNC SEPARATOR
CAPSTAN
DRUM
CTL
SERVO INPUT CONTROL
PWM / DA GATE PULSE GENERATOR 2CH
INTERRUPT CONTROLLER
SPC700 CPU CORE
CLOCK GEN. / SYSTEM CONTROL
ROM
(SOP116 --- ONE TIME P-ROM)
(80116 --- MASK ROM)
16K BYTES
RAM
352 BYTES
FRC CAPTURE UNIT
PRESCALER / TIME BASE TIMER
PROGRAMMABLE PATTERN GENERATOR
REAL TIME PULSE GENERATOR
PORT H
PORT G
PORT A
PORT B
PORT C
PORT D
PORT E
PORT F
EXTAL XTAL RST MP
34 35 32 31
54 53 52
70 40 69 71
PA0 – PA7 / PPO
PB0 – PB7 / PPO
PC0 – PC7 / RTO
PD0 – PD7
PF0 – PF7

HA11465A

NTSC COLOR TV VIDEO AMPLIFIER
—TOP VIEW—



16
15
14
13
12
11
10
9
Vcc (+12V)
GND
17
1
2
3
4
5
6
7
8
18

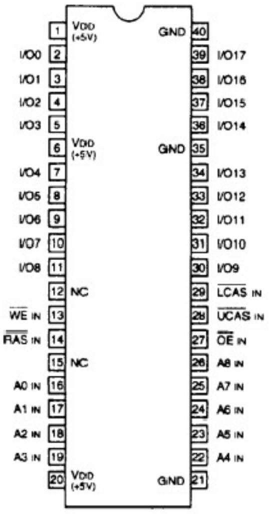


CHROMA OUT 14
AP IN 12
AP CONT 13
CNTR CONT 11
CNTR OUT (1) 10
CNTR OUT (2) 9
V.AMP IN 7
VIDEO IN 15
VIDEO BUFFER
VIDEO CONTROL
CONTRAST CONTROL
VIDEO AMP
8 VIDEO OUT
SYNC IN 16
NOISE CANCEL
SYNC SEPARATOR
PEDESTAL CLAMP
BLANKING
1 SYNC SEP (1)
2 SYNC SEP (2)
3 SYNC OUT
6 BRT CONT
4 BLK IN
5 BLK IN

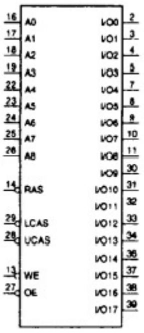
AP ; APERTURE
BLK ; BLANKING
BRT ; BRIGHTNESS
CNTR ; CONTRAST
CONT ; CONTROL
SYNC SEP ; SYNCHRONIZATION PULSE SEPARATION
V.AMP ; VIDEO AMPLIFIER

HM514280AJ-7

C-MOS 4M (262144Wx18)-BIT DYNAMIC RAM
—TOP VIEW—



1 VDD (+5V)
2 I/O0
3 I/O1
4 I/O2
5 I/O3
6 VDD (+5V)
7 I/O4
8 I/O5
9 I/O6
10 I/O7
11 I/O8
12 NC
13 WE IN
14 RAS IN
15 NC
16 A0 IN
17 A1 IN
18 A2 IN
19 A3 IN
20 VDD (+5V)
40 GND
39 I/O17
38 I/O16
37 I/O15
36 I/O14
35 GND
34 I/O13
33 I/O12
32 I/O11
31 I/O10
30 I/O9
29 LCAS IN
28 UCAS IN
27 OE IN
26 A8 IN
25 A7 IN
24 A6 IN
23 A5 IN
22 A4 IN
21 GND



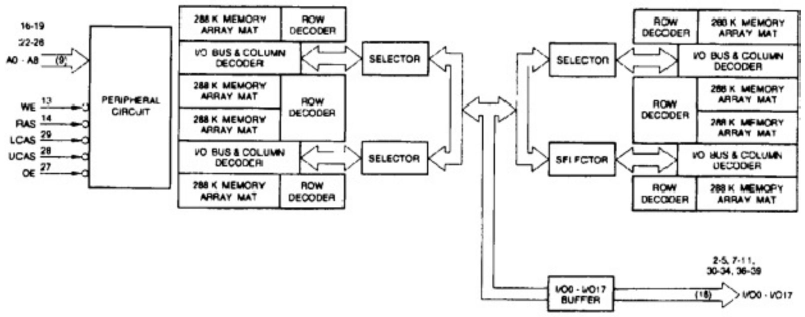
16 A0
17 A1
18 A2
19 A3
22 A4
23 A5
24 A6
25 A7
26 A8
14 RAS
29 LCAS
28 UCAS
13 WE
27 OE
I/O0 2
I/O1 3
I/O2 4
I/O3 5
I/O4 7
I/O5 8
I/O6 9
I/O7 10
I/O8 11
I/O9 30
I/O10 31
I/O11 32
I/O12 33
I/O13 34
I/O14 36
I/O15 37
I/O16 38
I/O17 39

INPUT

A0 - A8 ; ADDRESS
(ROW/REFRESH: A0 - A8,
COLUMN: A0 - A8)
$\overline{\text{LCAS}}$; COLUMN ADDRESS STROBE
$\overline{\text{OE}}$; OUTPUT ENABLE
$\overline{\text{RAS}}$; LOW ADDRESS STROBE
$\overline{\text{UCAS}}$; COLUMN ADDRESS STROBE
$\overline{\text{WE}}$; REED/WRITE INPUT

INPUT/OUTPUT

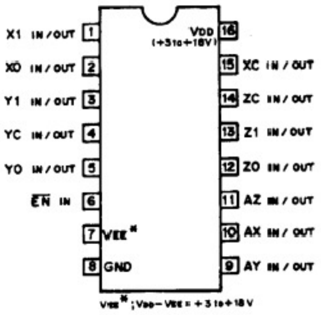
I/O0 - I/O17 ; DATA INPUT/OUTPUT



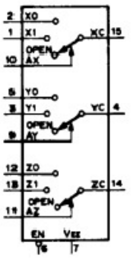
16-19
22-26
A0 - A8
(9)
WE 13
RAS 14
LCAS 29
UCAS 28
OE 27
PERIPHERAL CIRCUIT
288 K MEMORY ARRAY MAT
ROW DECODER
I/O BUS & COLUMN DECODER
SELECTOR
2-5, 7-11, 30-34, 36-39
I/O0 - I/O17 BUFFER
(18)
I/O0 - I/O17

HD14053BFP (HITACHI) FLAT PACKAGE

C-MOS TRIPE 2-CHANNEL ANALOG MULTIPLEXERS/DEMULTIPLEXERS
—TOP VIEW—



X1 IN/OUT 1
X0 IN/OUT 2
Y1 IN/OUT 3
YC IN/OUT 4
Y0 IN/OUT 5
EN IN 6
7 VEE*
8 GND
VDD (+3 to +18V) 16
15 XC IN/OUT
14 ZC IN/OUT
13 Z1 IN/OUT
12 Z0 IN/OUT
11 AZ IN/OUT
10 AX IN/OUT
9 AY IN/OUT



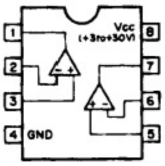
2 X0
1 X1
10 OPEN AX
XC 15
5 Y0
3 Y1
9 OPEN AY
YC 4
12 Z0
13 Z1
11 OPEN AZ
ZC 14
EN 6
VEE 7

VEE* ; VDD − VEE = +3 to +18 V

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE.

CONT. INPUTS		ON CHANNEL
EN	A (X, Y, Z,)	
0	0	0
0	1	1
1	X	OPEN

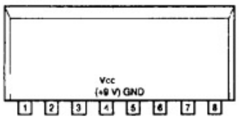
LM358PS (TI) FLAT PACKAGE

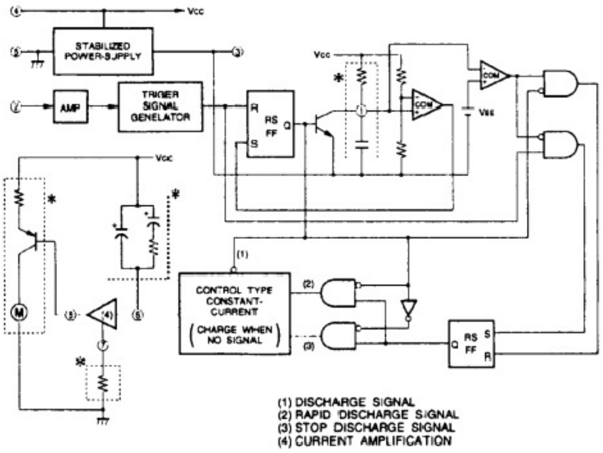


1
2
3
4 GND
Vcc (+3 to +30V) 8
7
6
5

M51970L (MITSUBISHI)

MOTOR SPEED CONTROL
—SIDE VIEW—


Vcc
(+9 V) GND
1
2
3
4
5
6
7
8

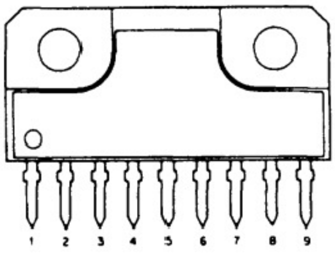

4
Vcc
5
STABILIZED POWER-SUPPLY
3
7
AMP
TRIGER SIGNAL GENELATOR
R
RS FF
Q
S
Vcc
*
1
COM
COM
Vcc
Vcc
*
*
M
8
(4)
6
7
*
(1)
CONTROL TYPE CONSTANT-CURRENT
(CHARGE WHEN NO SIGNAL)
(2)
(3)
Q
RS FF
S
R

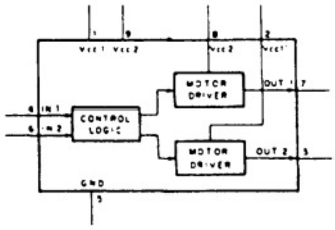
(1) DISCHARGE SIGNAL
(2) RAPID DISCHARGE SIGNAL
(3) STOP DISCHARGE SIGNAL
(4) CURRENT AMPLIFICATION

Note:
1. ◯ mark is pin number.
2. ∗ The areas with dotted line mean the parts installed out side.

M54543L (MITSUBISHI)

BI-DIRECTIONAL MOTOR DRIVER
—SIDE VIEW—



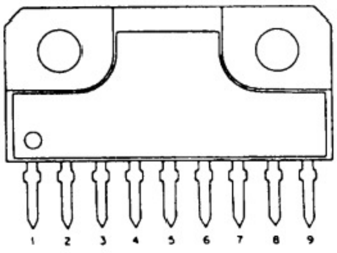

1
9
8
2
Vcc 1
Vcc 2
Vcc 2'
Vcc 1'
MOTOR DRIVER
OUT 1
7
4
IN 1
6
IN 2
CONTROL LOGIC
MOTOR DRIVER
OUT 2
3
GND
5

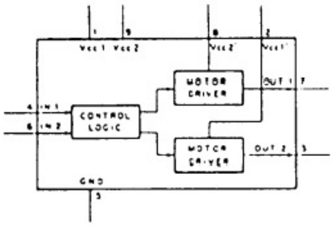
IN		OUT		MODE
1	2	1	2	
0	0	Z	Z	NO OPERATION
1	0	1	0	ROTATION
0	1	0	1	REVERSE ROTATION
1	1	0	0	BRAKE

0 : LOW LEVEL
1 : HIGH LEVEL
Z : HIGH IMPEDANCE

M54544AL (MITSUBISHI)

BI-DIRECTIONAL MOTOR DRIVER
—SIDE VIEW—



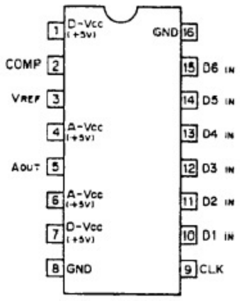

1
9
8
2
Vcc 1
Vcc 2
Vcc 2'
Vcc 1'
MOTOR DRIVER
OUT 1
7
4
IN 1
6
IN 2
CONTROL LOGIC
MOTOR DRIVER
OUT 2
3
GND
5

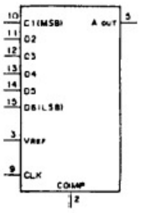
IN		OUT		MODE
1	2	1	2	
0	0	Z	Z	NO OPERATION
1	0	1	0	ROTATION
0	1	0	1	REVERSE ROTATION
1	1	0	0	BRAKE

0 : LOW LEVEL
1 : HIGH LEVEL
Z : HIGH IMPEDANCE

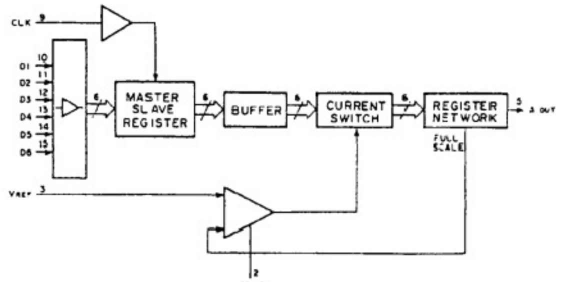
MB40776PF

6-BIT VIDEO D/A CONVERTER
—TOP VIEW—


1 D-Vcc (+5V)
COMP 2
VREF 3
4 A-Vcc (+5V)
AOUT 5
6 A-Vcc (+5V)
7 D-Vcc (+5V)
8 GND
GND 16
15 D6 IN
14 D5 IN
13 D4 IN
12 D3 IN
11 D2 IN
10 D1 IN
9 CLK

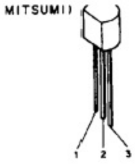

10 D1(MSB)
11 D2
12 D3
13 D4
14 D5
15 D6(LSB)
3 VREF
9 CLK
COMP
2
A OUT 5

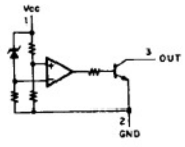
AOUT ; ANALOG OUTPUT
CLK ; CLOCK INPUT
COMP ; COMPENSATION
D1 - D6 ; DIGITAL INPUTS
VREF ; REFERENCE VOLTAGE INPUT


CLK 9
D1 10
D2 11
D3 12
D4 13
D5 14
D6 15
6
MASTER SLAVE REGISTER
6
BUFFER
6
CURRENT SWITCH
6
REGISTER NETWORK
5 A OUT
FULL SCALE
VREF 3
2
COMP

PST523C (MITSUMI) 4.5V

SYSTEM RESETTING DEVICE


MITSUMI)
1
2
3

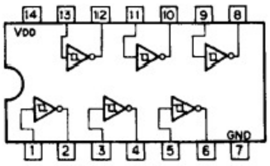

Vcc
1
3
OUT
2
GND

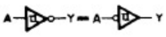
REF.; REFERENCE VOLTAGE

SN74HC14ANS (TI) FLAT PACKAGE

C-MOS HEX SCHMITT TRIGGER INVERTERS

—TOP VIEW—

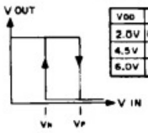

14
13
12
11
10
9
8
VDD
GND
1
2
3
4
5
6
7



$Y = \overline{A}$

A	Y
0	1
1	0

0;LOW LEVEL
1;HIGH LEVEL



VDD	VN	VP
2.0V	0.75V	1.25V
4.5V	1.9V	2.7V
6.0V	2.6V	3.6V

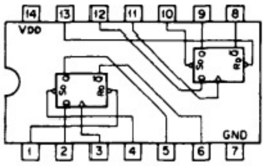
NOTE :

TYPE	VDD
TC74AC/VHC	+2 to +5.5V
OTHER TYPES	+2 to +6V

SN74HC74ANS (TI) FLAT PACKAGE

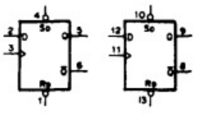
C-MOS DUAL D-TYPE FLIP-FLOPS WITH DIRECT SET/RESET

—TOP VIEW—


14
13
12
11
10
9
8
VDD
GND
1
2
3
4
5
6
7

INPUTS				OUTPUTS	
$\overline{S_D}$	$\overline{R_D}$	CK	D	Q_{n+1}	$\overline{Q}_{n+1}$
0	1	X	X	1	0
1	0	X	X	0	1
0	0	X	X	1	1
1	1	∫	1	1	0
1	1	∫	0	0	1
1	1	0	X	Q_n	$\overline{Q}_n$

0;LOW LEVEL
1;HIGH LEVEL
X;DON'T CARE


4
SD
2
D
3
Q
3
Q̄
6
RD
1
10
SD
12
D
11
Q
9
Q̄
8
RD
13

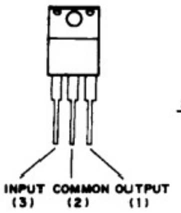
NOTE :

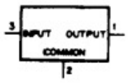
TYPE	VDD
HCT/ACT	+5V
TC74AC/VHC	+2 to +5.5V
OTHERS	+2 to +6V

TA7812S (TOSHIBA) + 12V (1 A)

POSITIVE VOLTAGE REGULATOR

—FRONT VIEW—

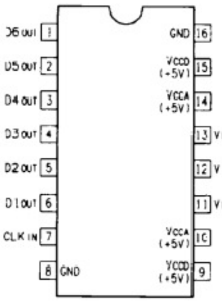

INPUT
(3)
COMMON
(2)
OUTPUT
(1)

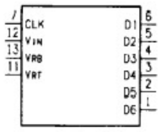

3
INPUT
OUTPUT
1
COMMON
2

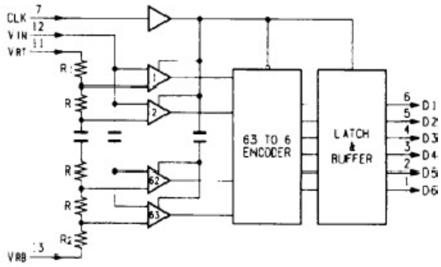
TL5501CDWA (TI)

6-BIT A/D CONVERTER

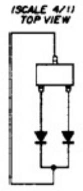
—TOP VIEW—


D6 OUT 1
D5 OUT 2
D4 OUT 3
D3 OUT 4
D2 OUT 5
D1 OUT 6
CLK IN 7
8 GND
GND 16
VCCD (+5V) 15
VCCA (+5V) 14
13 VRB
12 VIN
11 VRT
VCCA (+5V) 10
VCCD (+5V) 9

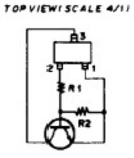

7
CLK
12
VIN
13
VRB
11
VRT
D1
6
D2
5
D3
4
D4
3
D5
2
D6
1


CLK
7
VIN
12
VRT
11
R
R
R
R
R2
VRB
13
1
2
62
63
63 TO 6
ENCODER
LATCH
&
BUFFER
6
D1
5
D2
4
D3
3
D4
2
D5
1
D6

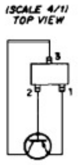
1SS184


(SCALE 4/1)
TOP VIEW

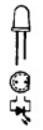
DTC114EK
DTC124EK


TOP VIEW (SCALE 4/1)
3
2
1
R1
R2

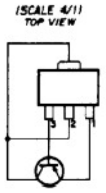
2SA1162-G


(SCALE 4/1)
TOP VIEW
3
2
1

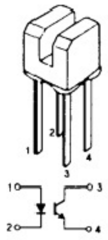
GL-520



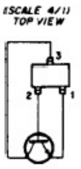
2SB798-DL


(SCALE 4/1)
TOP VIEW
3
2
1

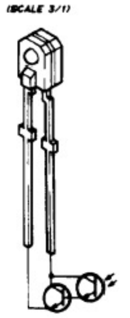
GP2S40K



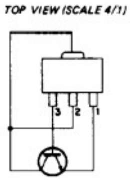
2SC2712-YG


(SCALE 4/1)
TOP VIEW
3
2
1

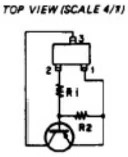
PT493F



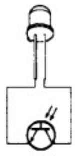
2SD999-CLCK


TOP VIEW (SCALE 4/1)
3
2
1

DTA124EK


TOP VIEW (SCALE 4/1)
3
2
1
R1
R2

PT501A



SECTION 5
CIRCUIT DESCRIPTION

5-1. VIDEO CIRCUIT

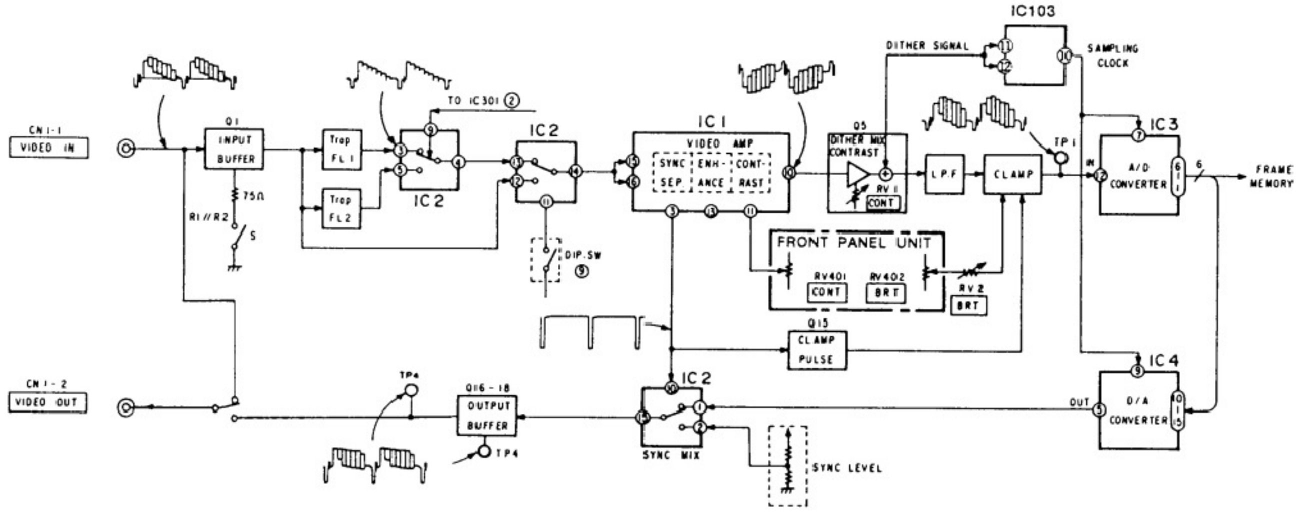
5-1-1. Operation

A composite video signal is input from the BNC connector(CN1-(VIDEO-IN)) to the MA-19 board. The composite video signal is terminated with 75 ohms by R1 and R2 when the DIP switch (S302-⑫) is set to ON. The signal then passes through the input buffer and branches into three routes. Two of these three signals are input through trap circuit 1 (FL1 for NTSC signal) and trap circuit 2 (FL2 for PAL signal) to the analog switch (IC2-③⑤) and selected in accordance with the NTSC or PAL judgment of a microcomputer. The automatically selected signal and the signal supplied directly to the input buffer are input to the analog switch (IC2-⑫⑬). An original signal is selected when the DIP switch (S302-⑪) is set to ON. A luminance signal (Y signal) from which the color subcarrier signal has been extracted by the trap circuit is selected when it is set to OFF. The selected signal is input through the buffer to IC1-⑮⑯.

IC1 (1) extracts the C sync signal, (2) emphasizes the picture, and (3) adjusts the contrast. The extracted C sync signal is output from IC1-③. The degree of the picture emphasis does not change because the value of the DC voltage input to IC 1-⑬ is fixed. The signal gain is controlled by changing the DC voltage value at IC 1-⑪ with the CONT control on the front panel. The gain of the video signal output from IC1-⑩ is adjusted with RV1. The dither signal output from IC103-⑪⑫ is injected into the gain-adjusted signal. The signal is then band-limited using a low-pass filter and passed through the clamping circuit. The clamp level at that time is determined by RV2 and the BRT control on the front panel.

The video signal is then input to the analog-digital converter (IC3-⑫) and converted into 6-bit digital data.

The sampling clock for the analog-digital converter is the 18.432 MHz clock output from IC103-⑩. The converted digital data is sent to frame memory (IC104) and digital-analog converter IC4 and reconverted into analog data. The resultant signal is output from IC4-⑤. Since this signal lacks a sync signal, the sync signal is injected by analog switch IC2. An original signal supplied directly to CN1-(VIDEO IN) is output from CN1-(VIDEO OUT).



CN1-1
VIDEO IN
Q1
INPUT BUFFER
75Ω
R1 // R2
S
Trap FL1
Trap FL2
TO IC301 ②
IC2
IC2
DIP.SW ⑨
IC1
VIDEO AMP
SYNC SEP.
ENH-ANCE
CONT-RAST
IC103
DITHER SIGNAL
SAMPLING CLOCK
Q5
DITHER MIX
CONTRAST
RV1
CONT
L.P.F
CLAMP
TP1
IN
IC3
A/D CONVERTER
6
FRAME MEMORY
FRONT PANEL UNIT
RV401
CONT
RV402
BRT
RV2
BRT
Q15
CLAMP PULSE
IC4
OUT
D/A CONVERTER
CN1-2
VIDEO OUT
TP4
Q16-18
OUTPUT BUFFER
TP4
IC2
SYNC MIX
SYNC LEVEL

Fig.5-1. Video Signal Processing Section Block Diagram

5-2. OSCILLATION CIRCUIT

An external crystal oscillator is connected to IC101, so the master clock is output from Pin ① and the sampling clock is output from Pin ⑤. Both these clocks are 18.432 MHz, but the phase of the sampling clock is matched at the falling edge of the EXTH signal input to Pin ⑩. (See the figure below.)

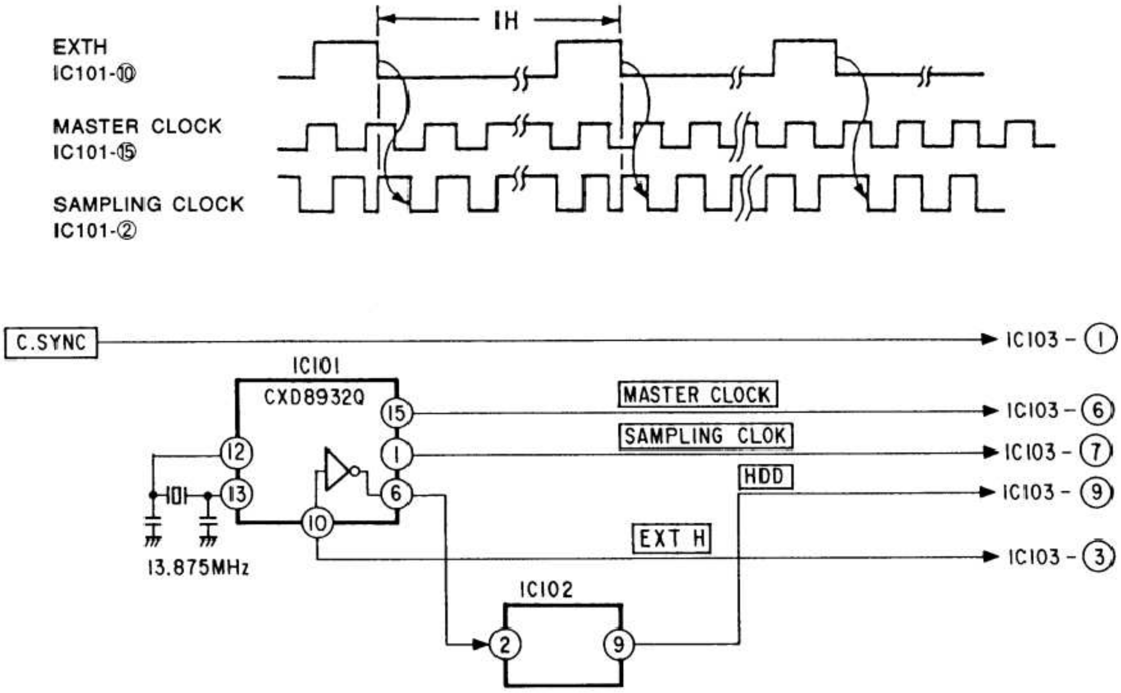

IH
EXTH
IC101-⑩
MASTER CLOCK
IC101-⑮
SAMPLING CLOCK
IC101-②
C.SYNC
IC103-①
IC101
CXD8932Q
15
1
12
13
6
10
101
13.875MHz
MASTER CLOCK
IC103-⑥
SAMPLING CLOK
IC103-⑦
HDD
IC103-⑨
EXT H
IC103-③
IC102
2
9

Fig.5-2 Clock Timing Chart and Circuit Diagram.

5-3. PERIPHERAL CIRCUIT IC103

IC103 consists of the following blocks.

(1) Operation coefficient memory (for variable power operation of picture)
(2) Storage register of serial data from CPU (for mode setting)
(3) Frame memory write and read control
(4) 1-line print timing pulse generation
(5) Thermal head control
(6) Dither signal generation
(7) Sync signal processing circuit
(8) 1-line memory
(9) Picture variable power operation circuit

The operation of each block is determined by the serial data from a CPU and the mode selection pin.

5-3-1. Operation Description

(1) Write in operation coefficient memory

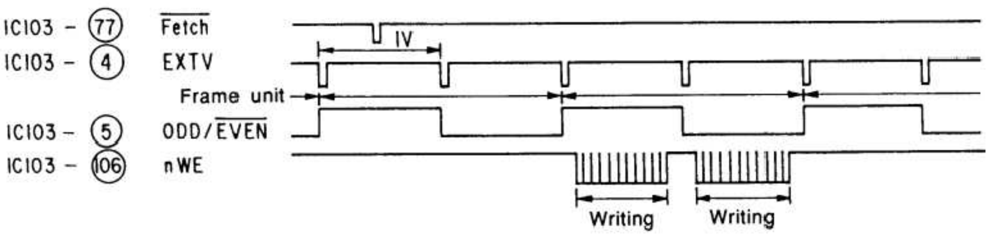
A CPU writes 128-byte coefficient data requires for the variable power operation of a picture in the operation coefficient memory inside IC103. This operation is performed only once during the power-on sequence.

(2) Mode setting

A CPU transfers serial data of 112 bits to the shift register in IC103 when it judges the status of DIP switch S302. The modes of each block in IC103 are set by this data.

(3) Write in frame memory

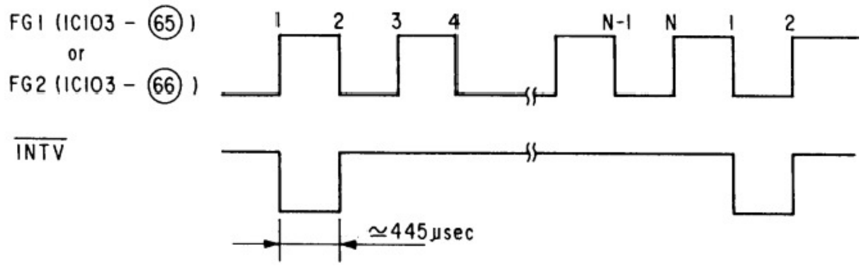
When a $\overline{\text{Fetch}}$ pulse is input from the CPU to pin (77) of IC103, the next data of one frame is written in frame memory. At that time, the nWE signal at pin (106) of IC103 changes as shown below.



(4) Print timing pulse generation

A print timing pulse ($\overline{\text{INTV}}$) for every line is produced by decrementing the rising and falling edges of two FG pulses FG1 or FG2 of a DC motor servo. FG pulses FG1 and FG2, and decrement count "N" are set by the serial data from a CPU. By changing the FG pulses and decrement count, the print period changes and the print line pitch also changes because the motor speed is constant.

The print timing pulse ($\overline{\text{INTV}}$) is used for the detection of CPU motor speed as well as print timing. The CPU judges the motor speed from the period of the $\overline{\text{INTV}}$ pulse and stops the motor when it detects abnormality.



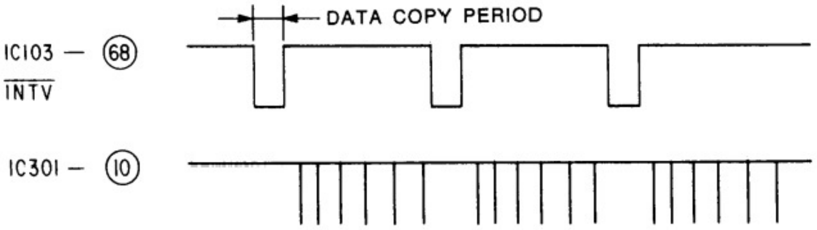
	STD		SIDE	
	NTSC	PAL	NTSC	PAL
Normal	FG2, N=12	FG2, N=10	FG1, N=10	FG1, N=10
Small	FG2, N=12	FG2, N=10	FG1, N=10	FG1, N=10
Zoom 1.5×	FG2, N= 9	FG1, N= 7	FG2, N= 8	FG2, N= 8
Zoom 2×	FG2, N=12	FG2, N=10	FG1, N=10	FG1, N=10

(5) Transfer from frame memory to line memory

When a $\overline{\text{COPY}}$ pulse is input from the CPU, IC103 sets $\overline{\text{COPYING}}$ low and enters the print operation state. To ensure printing, the one-line data selected out of frame memory must be transferred to the one-line memory incorporated in IC103.

The frame memory consists of two field memories that are classified into odd and even fields. IC103 reads necessary print data from the frame memory in the order corresponding to the print range and direction specified for mode setting by the CPU and transfers the data to the one-line memory in IC103 after variable power processing.

Data is transferred for every INTV pulse during low period.

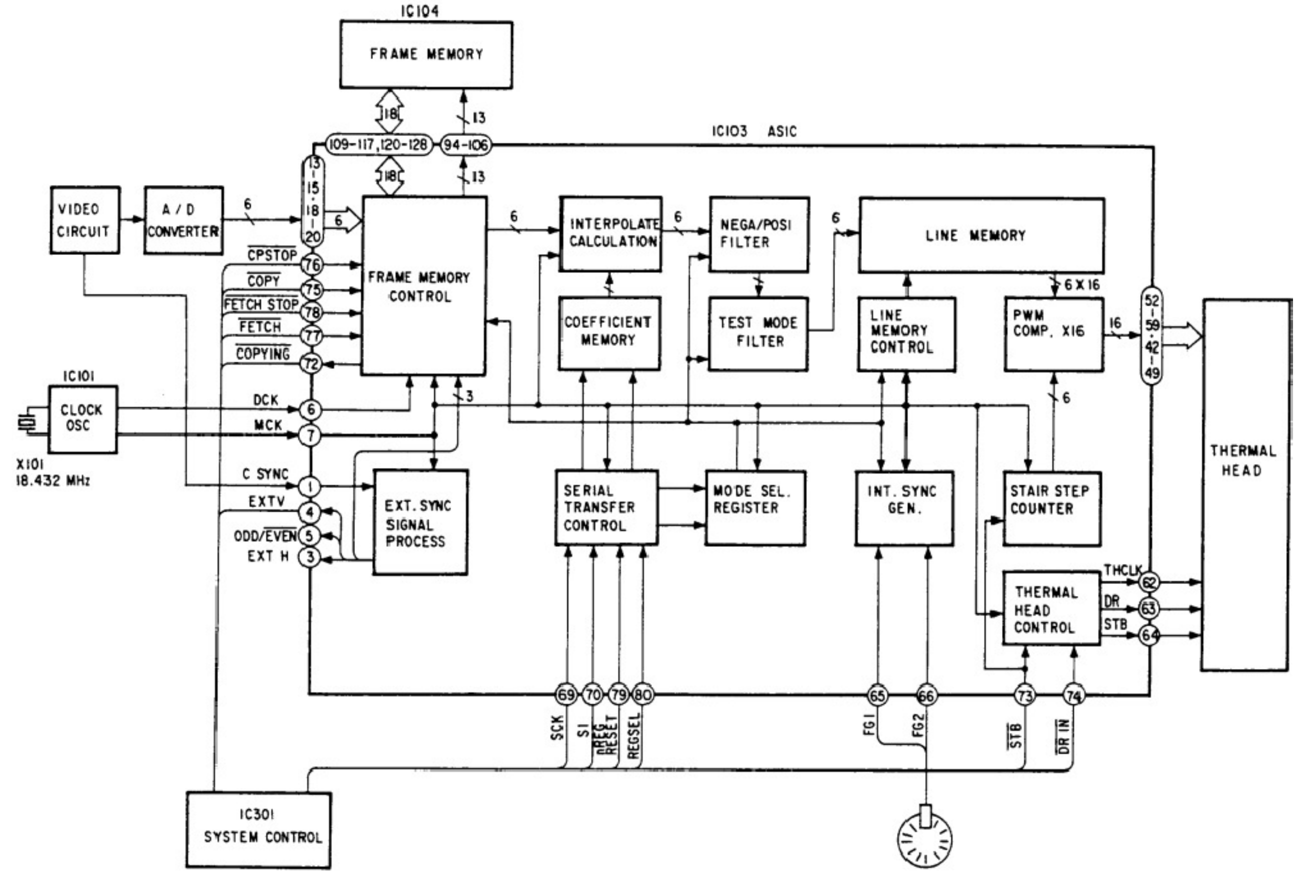


(6) Read from one-line memory

Data is read from one-line memory while an $\overline{\text{INTV}}$ pulse is high. When an $\overline{\text{STB}}$ pulse is input to pin ⑬ of IC103 from the CPU, IC102 initiates the read operation from the one-line memory and is compared with a gradation counter. The comparison result is converted from serial to parallel, sent to the thermal head, and latched in the thermal head using a next $\overline{\text{STB}}$ pulse. When a $\overline{\text{DR}}$ signal is output from the CPU, the thermal head is turned on according to the latched data. This read operation is repeated 64 times while an INTV pulse is high. One-line printing is then completed.

(7) Printing completion

A CPU sets the print start coordinates and print end coordinates by serial data. When the printing in the set range is completed, IC103 sets $\overline{\text{COPYING}}$ high again and notifies the CPU that one-screen printing is completed.


IC104
FRAME MEMORY
18
13
109-117,120-128
94-106
IC103 ASIC
13
15
18
20
VIDEO CIRCUIT
A / D CONVERTER
6
FRAME MEMORY CONTROL
CPSTOP
COPY
FETCH STOP
FETCH
COPYING
76
75
78
77
72
IC101
CLOCK OSC
X101
18.432 MHz
DCK
MCK
6
7
3
C SYNC
EXTV
ODD/EVEN
EXT H
1
4
5
3
EXT. SYNC SIGNAL PROCESS
INTERPOLATE CALCULATION
COEFFICIENT MEMORY
NEGA/POSI FILTER
TEST MODE FILTER
LINE MEMORY
LINE MEMORY CONTROL
PWM COMP. X16
6 X 16
16
52
59
42
49
THERMAL HEAD
SERIAL TRANSFER CONTROL
MODE SEL. REGISTER
INT. SYNC GEN.
STAIR STEP COUNTER
THERMAL HEAD CONTROL
THCLK
DR
STB
62
63
64
69
70
79
80
65
66
73
74
SCK
SI
DREG RESET
REGSEL
FG1
FG2
STB
DR IN
IC301
SYSTEM CONTROL

5-4. SYSTEM CONTROL SECTION

PRINT preparations

(i) Turn on the power and check that the POWER LED lights .

(ii) Set paper in place, close the door, and check that the PAPER EMPTY LED goes off.

(iii) Check that the Video signal (EIA or CCIR) is input to the VIDEO INPUT terminal.

* Note 1 : When the paper is set in place. IC301 – (57)"L" IC301 – (58)"H" This condition is met, IC301 switches off PAPER EMPTY-LED. (IC301-(80))

* Note 2 : IC301-㉜ is the reset terminal. When the power is first turned on, this pin is held low for a few msec, then set high to end the reset.

5-4-1. Memory write (FETCH) signals from the print key

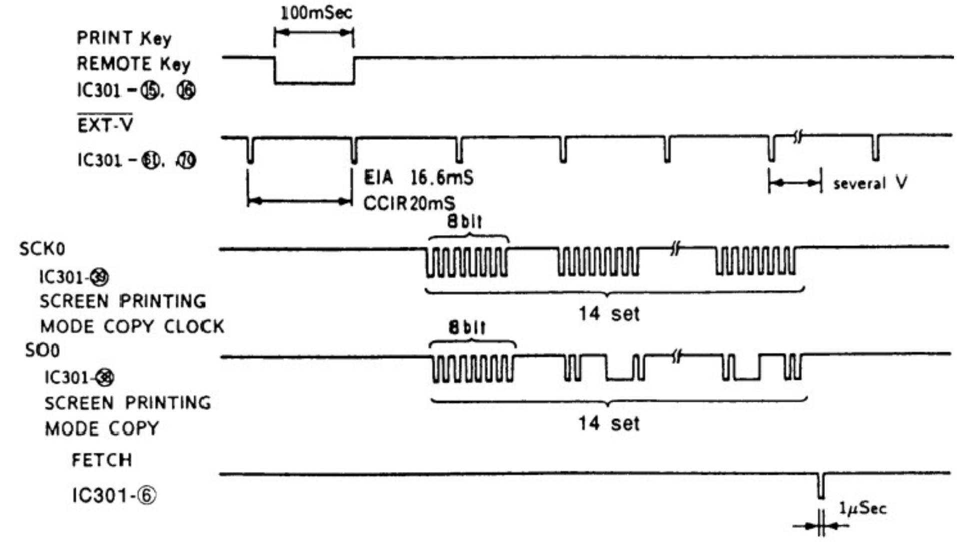

100mSec
PRINT Key
REMOTE Key
IC301 – ⑮. ⑯
EXT-V
IC301 – (61). (70)
EIA 16.6mS
CCIR20mS
several V
8bit
SCK0
IC301-㊴
SCREEN PRINTING
MODE COPY CLOCK
14 set
8bit
SO0
IC301-㊳
SCREEN PRINTING
MODE COPY
14 set
FETCH
IC301-⑥
1μSec

Fig. 5-4. Memory write timing chart

Operation

(i) When the PRINT key or REMOTE key signal is "L" for about 100 msec, the system enters PRINT MODE.

(ii) When the system enters PRINT mode, first it verifies $\overline{\text{EXT-V}}$, then it judges whether the format is EIA or CCIR.

(iii) Once the video format has been judged, the screen print mode data for that format is transferred to IC103-(70), the SI (serial input) terminal, from the SO0 (serial output) terminal sysnchronized with the SCK0 (serial clock). This data is eight sets of 8 bits each for a total of 14 set (112 data) bits.

(iv) A few EXT-V pulses after the data transfer is complete, the memory write timing signal (FETCH) is output. The timing is taken from IC103 and the video signal is recorded into the video memory, IC104.

5-4-2. From memory writing till screen printing

[I] From after memory writing till the $\overline{\text{INT-V}}$ pulse measurement.

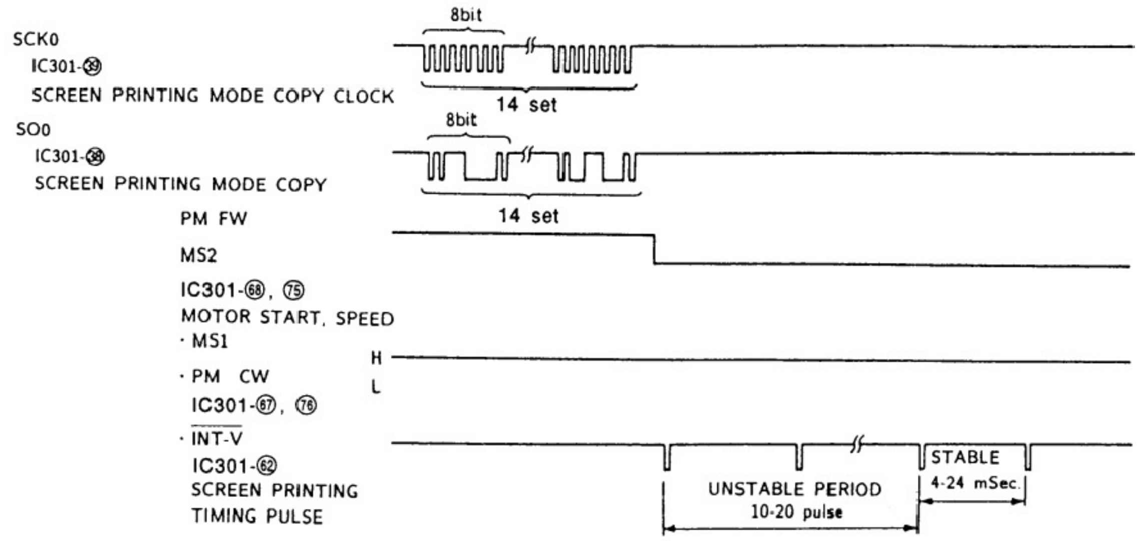

8bit
SCK0
IC301-㊴
SCREEN PRINTING MODE COPY CLOCK
14 set
8bit
SO0
IC301-㊳
SCREEN PRINTING MODE COPY
14 set
PM FW
MS2
IC301-(68), (75)
MOTOR START, SPEED
· MS1
H
L
· PM CW
IC301-(67), (76)
· $\overline{\text{INT-V}}$
IC301-(62)
SCREEN PRINTING
TIMING PULSE
UNSTABLE PERIOD
10-20 pulse
STABLE
4-24 mSec.

Fig. 5-5. Timing from memory writing till printing

Operation

The data input to the video memory (IC104) with the print key operation is printed with the following procedures :

*Note 1 : The copy key operation is triggered if the copy key is set "L" for at least 100 msec before this operation.

*Note 2 : This operation only occurs if a video signal is input to the video memory.

(i) Turn the Head U/D motor (IC301-(63), (64) : "H","L") and check that the Head goes down(IC301-(59), (60) : "L","H"). Then stop the motor(IC301-(63), (64) : "H","H") When the post feed is ON, rewind the paper simultaneously. Turn the platen motor in reverse (IC301-(67), (68) : "L","H") to return to the specified position, then stop the platen motor (IC301-(67), (68) : "H","H").

(ii) In order to specify the output format for the data from video memory, it is synchronized with the signal at the SCK0 terminal and the data is copied from the SO0 terminal to IC103-(70) (SI terminal).

(iii) When the data transfer is complete, the motor is rotated, $\overline{\text{INT-V}}$ is generated from IC103-(68), and input to IC301-(62). The operations of the PM FW (IC301-(68)), PM CW (IC301-(67)), MS1 (IC301-(76)), and MS2 (IC301-(75)) signals are as follows :

PM FW, PM CW · · · · Turn $\overline{\text{ON}}$/OFF the platen motor (forward, reverse)

MS1, MS2 · · · · · Switches HIGH/LOW of the platen motor speed, between 2 to 4 speed.

Here are the terminal states for each mode.

	PM FW	PM CW	MS1	MS2
STOP	H	H	H	H
3 : 4	L	H	H	L
1 : 1	L	H	L	H
Fast forward	L	H	L	H
Rewind	H	L	L	H

* Note : Since $\overline{\text{INT-V}}$ is made by counting down the FG frequency for the motor servo, if the motor is not turning, it is not output.

(iv) When the platen motor is turning and the FG pulses are input to IC103-(65),(66), $\overline{\text{INT-V}}$ is output from IC301-(68), and input to IC301-(62). Within IC301, $\overline{\text{INT-V}}$ is measured for about 10 to 20 pulses to ensure that $\overline{\text{INT-V}}$ has a fixed pulse width. After verifying that the pulse period is 4 to 24 msec, the system moves to the next screen operation.

[Ⅱ] From $\overline{\text{INT-V}}$ pulse measurement to screen printing

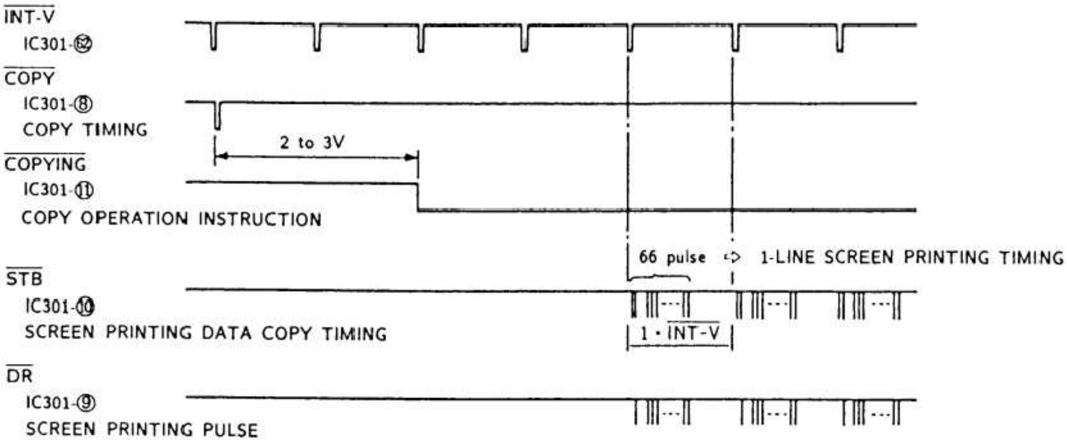

INT-V
IC301-(62)
COPY
IC301-⑧
COPY TIMING
2 to 3V
COPYING
IC301-⑪
COPY OPERATION INSTRUCTION
66 pulse
1-LINE SCREEN PRINTING TIMING
STB
IC301-⑩
SCREEN PRINTING DATA COPY TIMING
1 · INT-V
DR
IC301-⑨
SCREEN PRINTING PULSE

Fig.5-6. Screen Printing Timing

Operation

(i) When the platen motor rotation is stabilized and the $\overline{\text{INT-V}}$ period is stable, the $\overline{\text{COPY}}$ pulse is output to IC301-(75) synchronized with $\overline{\text{INT-V}}$.

(ii) When the $\overline{\text{COPY}}$ pulse is input to IC301-(75), IC103 outputs the $\overline{\text{COPYING}}$ pulse from its pin (72) to IC301-⑪ to tell it that IC103 is standing by for screen printing.

(iii) When IC301 verifies that $\overline{\text{COPYING}}$ is "L", it ouptuts $\overline{\text{STB}}$ and $\overline{\text{DR}}$. The screen printing timing is set by these signals.

*Note : If the period of $\overline{\text{INT-V}}$ fluctuates too greatly during screen printing, printing is stopped.

[Ⅲ] To the end of screen printing and stopping

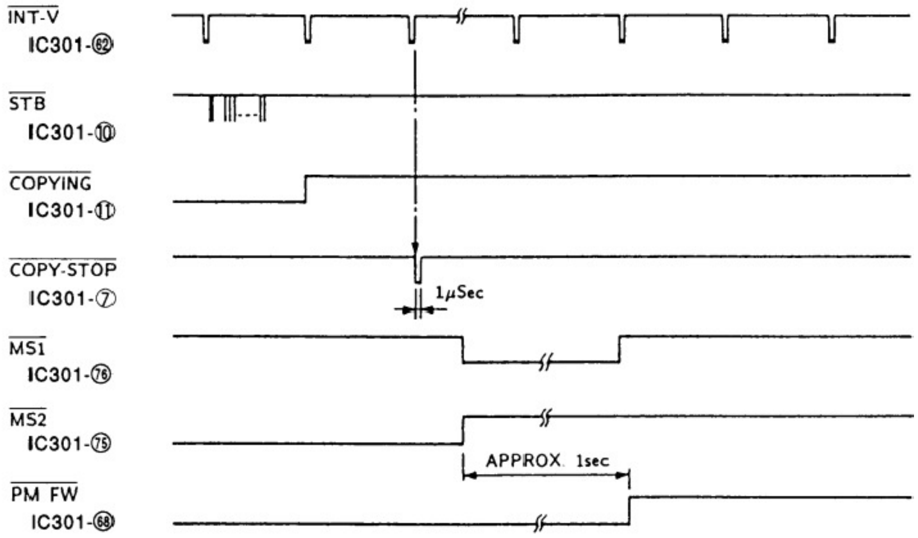


Fig.5-7. End of Screen Printing Timing

Operation

(i) IC103 counts the printing lines and when the specified number of lines have been printed, it outputs a "H" signal from its IC103-(72) to IC301-⑬, which tells IC301 that the printing operation has ended and it outputs the COPY-STOP pulse.

*Note : The COPY-STOP pulse is also output even if COPYNING is "L", if IC 301 judges that something abnormal has arisen. In such a case, when this COPY-STOP pulse is input to IC103, it sets COPYING "H".
This characteristic can be used to analyze any problem that causes printing to stop. If COPY-STOP was issued while COPYING is "L", the cause is related to IC301 screen printint is then stopped. If COPY-STOP was issued while COPYING is "H", the cause is related to IC103.

(ii) After the COPY-STOP pulse, MS1, MS2 are changed to fast forward for about 1 second, then PM FW is set "H" to stop.
Reverse the Head U/D motor (IC301-(63), (64) : "L","H") and check that the Head goes up (IC301-(59), (60) : "H","L"). Then stop the motor.
(IC301-(63), (64) : "H","H").

5-4-3. Mode set

No. 1 through 4, 6 through 10 of DIP switch S302 on the rear panel are input to IC301 to select each screen printing mode. The mode set is input from IC301-(38) to IC103-(70) in serial data format when the PRINT key and COPY key are pressed.
Each screen printing mode cannot be selected during screen printing.

5-5. MOTOR DRIVE SECTION (IC201)

The platen motor, Head UP/down motor, and Door motor are driven with IC201, IC202, IC203, and IC204,. They are all controlled by IC301.

5-5-1. Platen motor

The platen motor speed is controlled by IC201(M51970L). The frequency of the FG (optic read out) of the motor section is detected and fed back to IC201, which controls motor drive transistor Q205 to control the speed.

IC204 (M54544AL) can drive the motor in the forward or reverse direction.

The motor is turned ON/OFF and its speed controlled by IC301-(75),(76),(67),(68).

(See the explanation of the system control section.)

Since this unit produces the $\overline{\text{INT-V}}$ signal that provides the screen printing timing by dividing the FG frequency, even if there is some slight fluctuation in the FG frequency, the paper feed distance and printing quality are held constant.

5-5-2. Head U/D motor and DOOR motor

The Head U/D motor and DOOR motor are controlled by IC202 and 203 (both are M54543L). This IC can drive the motor in the forward or reverse direction, and it is controlled by IC301-(65),(66),(63),(64).

Head U/D motor

	IC301-(63)	IC301-(64)	Operation
DOWN	H	L	goes down the head
UP	L	H	goes up the head
STOP	H	H	locks to motor

Door motor

	IC301-(65)	IC301-(66)	Operation
OPEN	L	H	Opens the door
CLOSE	H	L	Closes the door

The above motor operation is controlled by detecting the condition of Head and Door with IC301 Pin(55),(56),(59),(60).

Head condition

	IC301-(59)	IC301-(60)	Condition
Top	L	L	Top position of the head to open the door.
Middle	H	L	Head is at this position except for PRINT
Bottom	L	H	Head is pressed against the platen.

Door condition

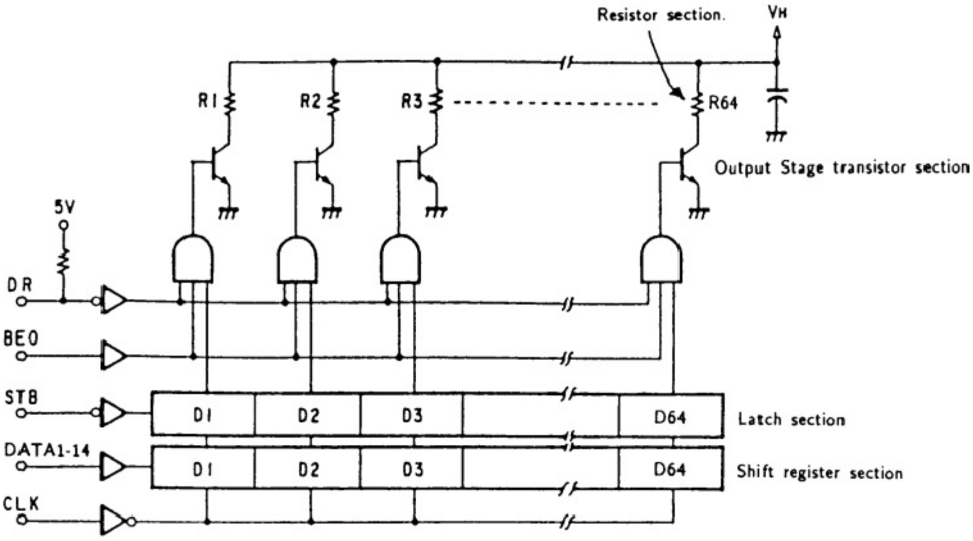
	IC301-(55)	IC301-(56)	Condition
Open	L	H	The door is opened.
Close	H	L	The door is closed.

5-6. THERMAL HEAD SECTION

The thermal head of this unit comprise 1-line of 1024 dots (64 bits × 16) and prints out the screen vertically.

5-6-1. Configuration

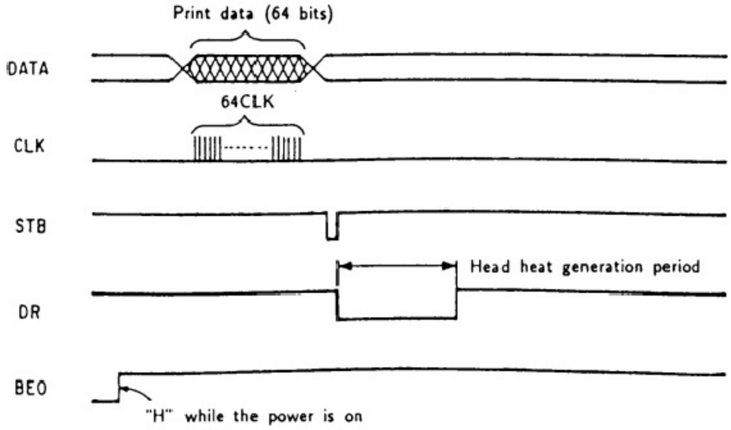
There are sixteen sets of the assemblise shown below. (The DATA inputs are DATA1 to 16. The other terminals are common.)



Resistor section.
VH
R1
R2
R3
R64
Output Stage transistor section
5V
DR
BEO
STB
DATA1-14
CLK
D1
D2
D3
D64
Latch section
Shift register section

Fig.5-8. Head Internal Circuit Configuration

5-6-2. Timing Chart



Print data (64 bits)
DATA
64CLK
CLK
STB
Head heat generation period
DR
BEO
"H" while the power is on

Fig.5-9. Timing Chart

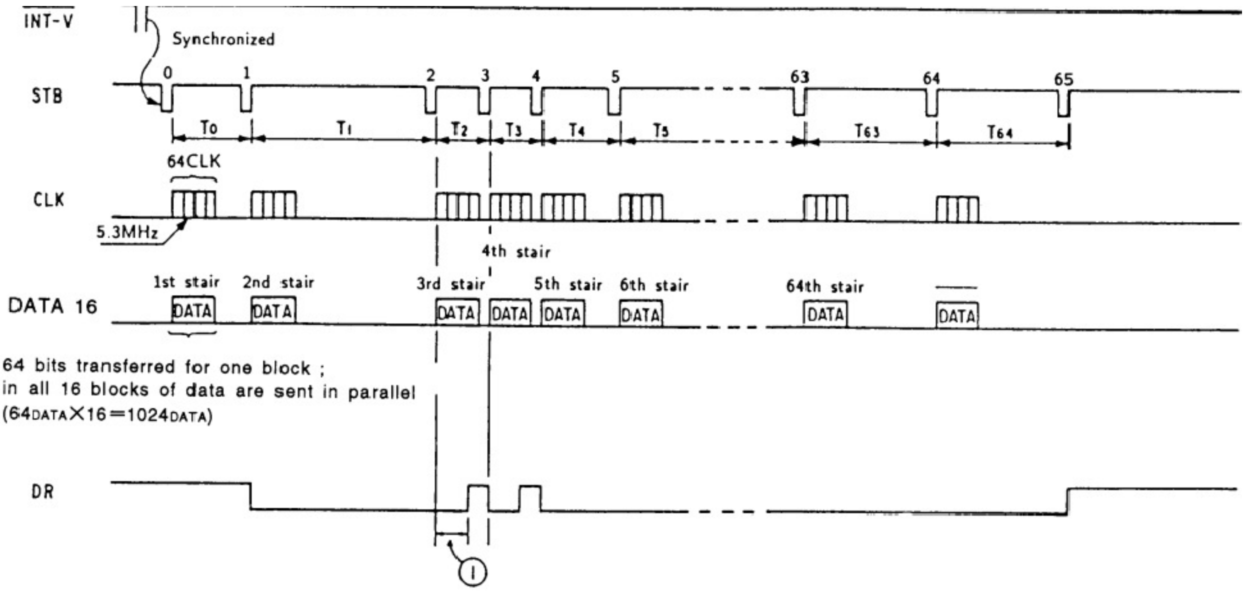

INT-V
Synchronized
STB
0
1
2
3
4
5
63
64
65
T0
T1
T2
T3
T4
T5
T63
T64
64CLK
CLK
5.3MHz
4th stair
1st stair
2nd stair
3rd stair
5th stair
6th stair
64th stair
DATA 16
DATA
64 bits transferred for one block ;
in all 16 blocks of data are sent in parallel
(64DATA×16=1024DATA)
DR
①

Fig.5-10. Stair Generation

5-6-3. Basic operation

All the signals are input to head from IC103. This section only explains the operations for one block. (The operations for the other blocks are the same.)

(i) The 64 data items of screen printing are input to the shift register synchronized with CLK.

(ii) When the STB pulse is input, the data input in (i) is moved from the shift register section to the latch section.

(iii) When the DR pulse is input, the output stage transistors are switched ON/OFF by the "H" and "L" latch section data. While the transistors are on, the resistors heat up and thermosensitive paper changes color. The amount of heat generated is controlled by varying the length of the DR pulses, so the color darkness of the printing on thermosensitive paper can be varied.

* Note : The BEO terminal goes from "L" to "H" only when the power is turned on. After that it stays "H".

5-6-4. Stair generation

As explained in the last section on basic operation, the darkness of the printing can be controlled with the DR pulses, but it is also possible to change the darkness by changing the high and low data input to the latch section. This section explains this method.

(i) The data recorded in video memory IC104 during print is input to gradation data generation circuit IC103 by one print line using a picture variable power operation circuit in IC103. The stair data generation circuit outputs the 6 bits of data recorded in IC103 as one of 64 levels. If the 6-bit data is "3" , then DATA "H" is sent to the head during the 1st, 2nd, and 3rd stairs of DATA 1 to 6 in Fig.5-10, but from the 4th stairs and later, the DATA "L" is sent.
In this way, the screen is printed with the third stair, but from the fourth stair and later is not printed.(See the explanation of the basic oerations in 5-6-3.)

(ii) The data is input to IC103, when the "0" STB pulse synchronized with INT-V is input, the first stair data is sent to the head shift register section synchronized with CLK.

(iii) When the "1"STB pulse is input, the 1st stair data is transferred to the latch section and the 2nd stair data is input to the shift register section. At the same time, the DR pulse goes "L" and the "H" data among the data input as the first stair data switches on the corresponding output stage transistors, heating up the corresponding resistors. The "L" data switches OFF the corresponding output stage transistors so those resistors do not heat up.

This operation is carried out 64 times. If "H" data is sent the 1 through 64 times, the resistors generate heat the entire time and the printing is the blackest possible. If the data is only high until the 32 times, the printing is an intermediate stair. This is how intermediate stairs are generated by sending high data a certain number of times and generating heat in the resistors that many times.

(iv) Thus, by controlling the time until the next data is transferred to the latch, the darkness of intermediate stairs can be achieved simply. In other words, intermediate stair darkness can be controlled by changing the STB intervals, T_0, T_1, T_2, T_3, T_4, · · · · · T_{63}, T_{64}.

Specifically, IC301 matches the intervals T_1 to T_{64} to the paper's γ characteristic (the degree of darkening relative to the heat applied). This is called γ characteristic control.

(v) If the DR pulse is also controlled as described in 5-6-3, even fine stair can be expressed.

* Note : The section in ① is generated when the STB pulse T interval is 26μsec. (The STB pulse T interval is a minimum of 26 μsec.)

Thus, this unit provides smooth expression of intermediate stairs by controlling the STB pulse T interval and the DR pulses.

5-6-5. Temperature compensation

As explained in 5-6-4, intermediate stairs are expressed by controlling the STB pulse T interval and the DR pulses, but since the energy required to make thermosensitive paper turn color varies with the room temperature and with the heat generated by and built up in the printing head during continuous printing.

This unit has a built-in thermistor (CN101-①,②) IC301 measures the change in the head temperature and to compensate for temperature change controls the STB pulse T interval and the DR pulse, just as is done for stair generation. Specifically, when the temperature rises it reduces the STB pulse T interval and the DR pulses, but when the temperature falls, it increases the STB pulse T interval and the DR pulses.

SECTION 6
EXPLODED VIEWS

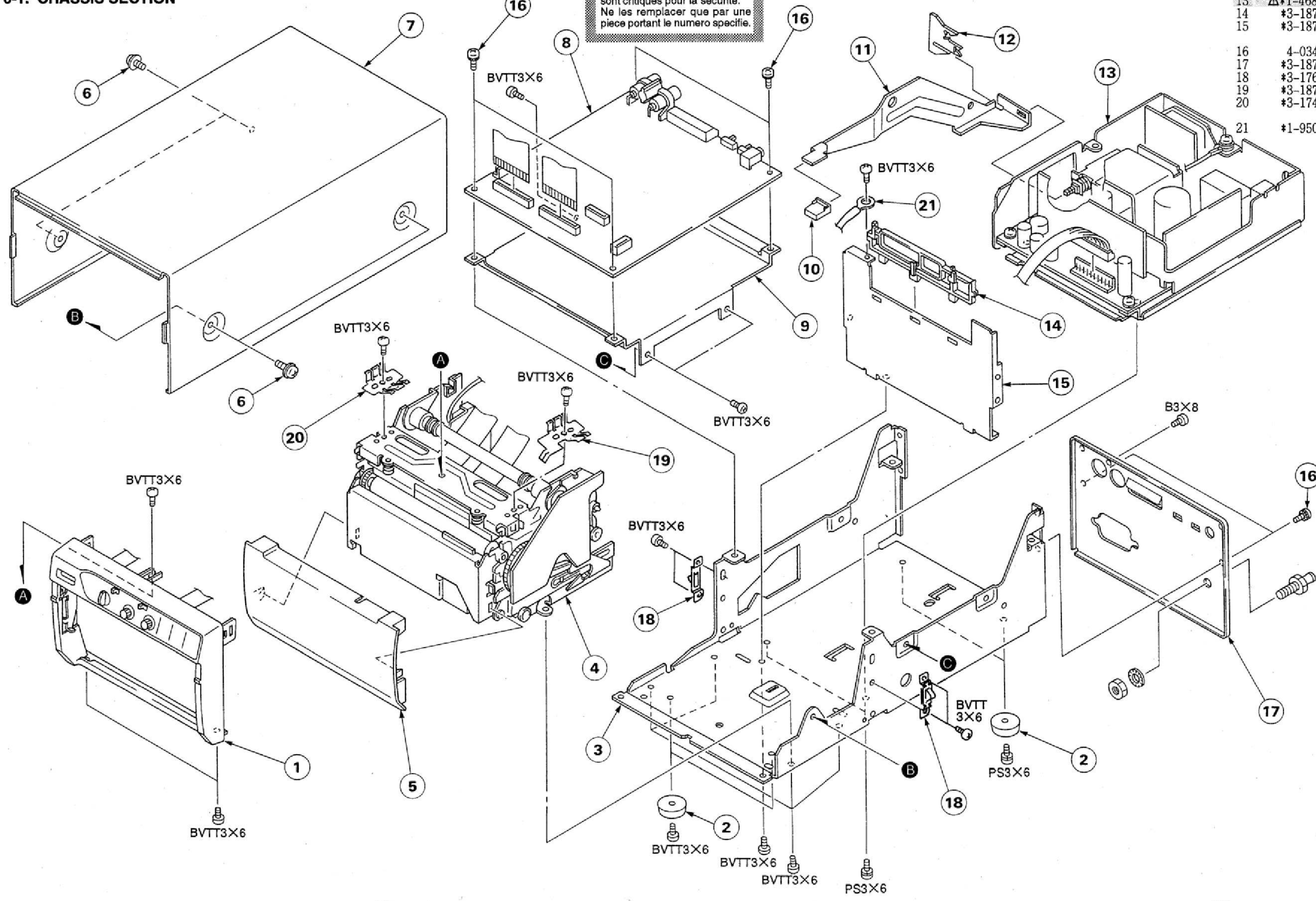
NOTE:

- Items with no part number and no description are not stocked because they are seldom required for routine service.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Items marked "*" are not stocked because they are seldom required for routine servicing.Some delay should be expected when ordering these items.

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

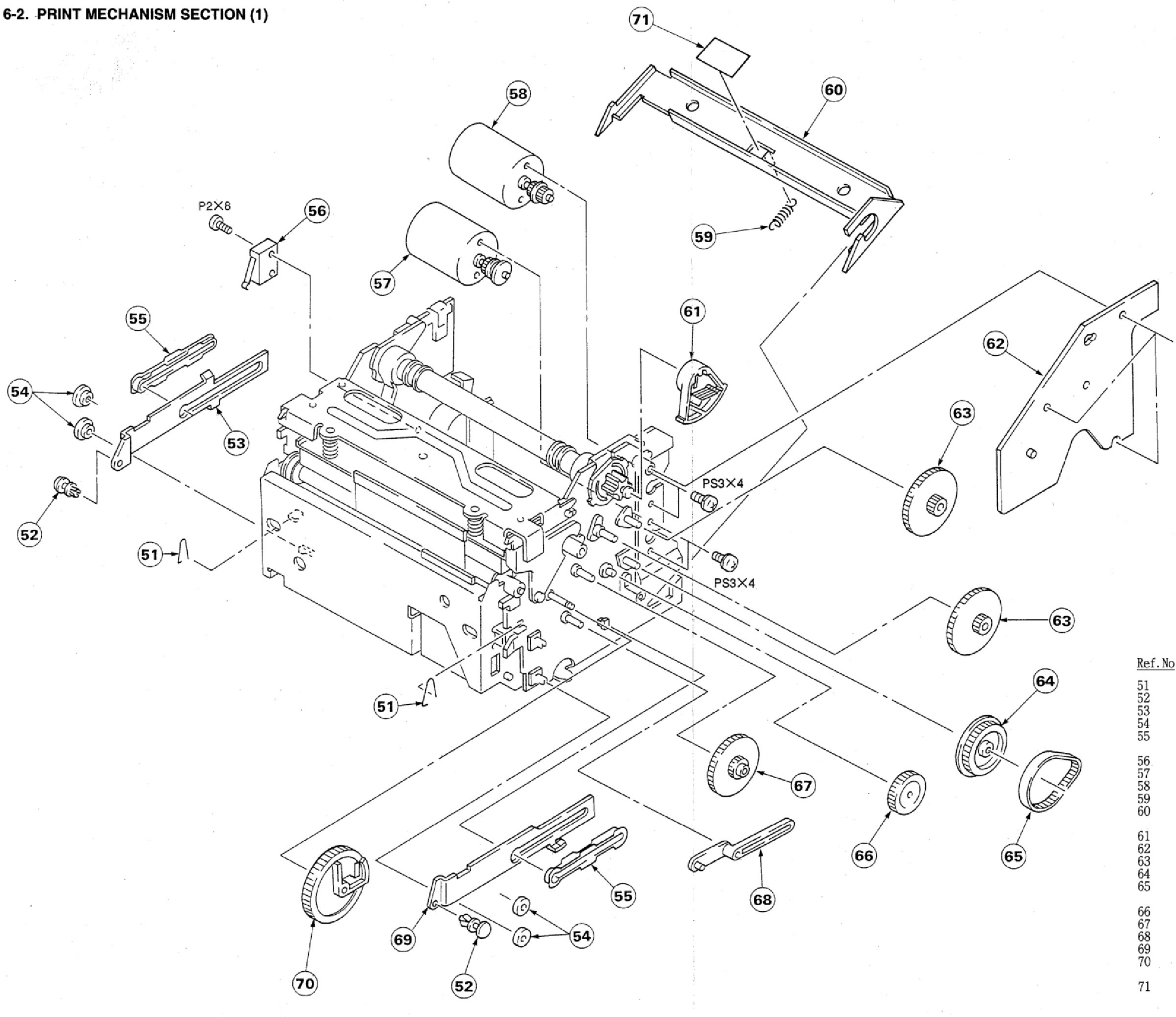
Les composants identifies par une trame et une marque ⚠ sont critiques pour la securite.
Ne les remplacer que par une piece portant le numero specifie.

6-1. CHASSIS SECTION



Ref.No	Part No.	Description	Remark
1	1-473-100-11	PANEL UNIT, FRONT	
2	3-734-866-01	FOOT	
3	*3-187-320-01	CHASSIS, FRAME	
4	*A-8265-916-A	BLOCK ASSY, MECHANICAL	
5	3-187-754-11	PANEL, DOOR (UP-890CE)	
	3-187-754-21	PANEL, DOOR (UP-890MD)	
6	4-886-821-11	SCREW, M3 CASE	
7	*3-187-319-01	COVER, TOP	
8	*A-8265-924-A	COMPLETE PCB, MA-19	
9	*3-187-755-01	PLATE, SHIELD	
10	3-187-313-01	BUTTON, POWER	
11	*3-173-923-03	ROD, POWER SWITCH	
12	*3-173-922-02	STOPPER, ROD"	
13	⚠*1-468-002-11	SWITCHING REGULATOR (SOPS-1088)	
14	*3-187-315-01	CLAMP, HARNESS	
15	*3-187-316-01	CHASSIS, CENTER	
16	4-034-937-01	SCREW (M3), TAPPING	
17	*3-187-325-11	PANEL, REAR	
18	*3-176-693-01	PLATE, GROUND (TC)	
19	*3-187-846-01	PLATE, GROUND (F)	
20	*3-174-629-02	PLATE, GROUND	
21	*1-950-127-13	HARNESS (H)	

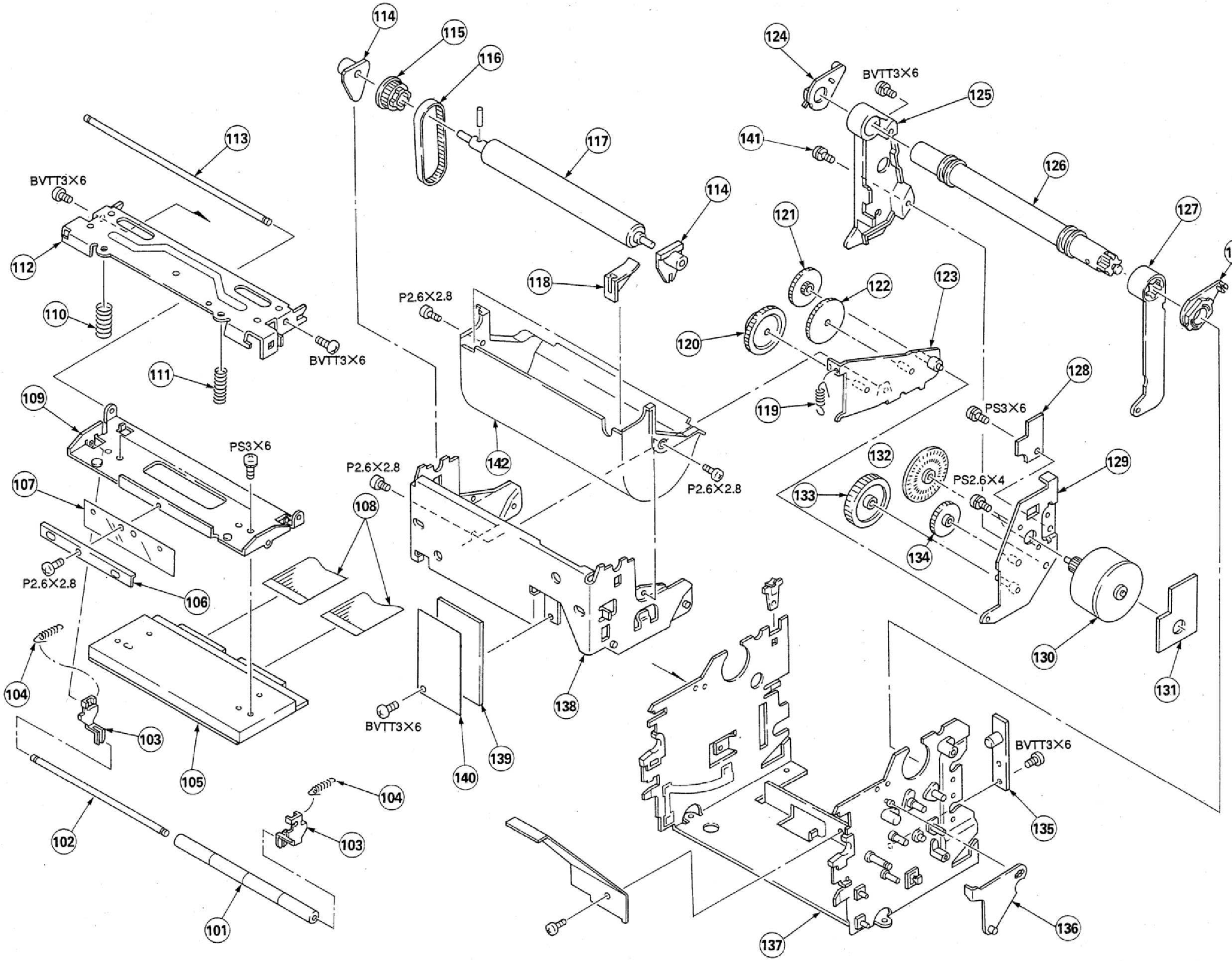
6-2. PRINT MECHANISM SECTION (1)



71
58
60
P2X8
56
59
57
61
55
62
B3X8
54
53
63
PS3X4
52
51
PS3X4
63
64
51
67
66
65
55
68
69
54
70
52

Ref.No	Part No.	Description	Remark
51	*3-173-548-02	SPRING, GROUND	
52	3-531-576-11	RIVET	
53	*3-173-554-01	RAIL (L)	
54	3-741-065-01	ROLLER, SLIDE	
55	3-173-558-01	GUIDE, RAIL	
56	1-554-512-00	SWITCH, MICRO	
57	X-3167-435-1	MOTOR ASSY, S GEAR	
58	X-3167-434-1	MOTOR ASSY, DOOR	
59	3-173-559-01	SPRING (LOCK), TENSION	
60	*3-173-981-02	ARM, LOCK	
61	X-3166-380-1	GEAR ASSY, DOOR	
62	*1-641-592-11	PC BOARD SE-9	
63	3-173-550-01	GEAR (D), IDLER	
64	3-173-553-02	PULLEY (H), GEAR	
65	3-173-560-01	BELT, 90TN	
66	3-173-551-01	GEAR (S), IDLER	
67	3-173-549-01	GEAR (H), IDLER	
68	3-173-556-01	LINK, EJECT	
69	*3-173-555-01	RAIL (R)	
70	X-3166-379-1	GEAR ASSY, CAM	
71	3-187-838-01	SHEET PROTECTION	

6-3. PRINT MECHANISM SECTION (2)


114
115
116
113
117
124
BVTT3×6
125
141
126
127
BVTT3×6
112
114
121
122
123
124
110
BVTT3×6
P2.6×2.8
118
120
111
128
119
109
PS3×6
PS3×6
132
142
129
P2.6×2.8
P2.6×2.8
133
PS2.6×4
107
108
134
P2.6×2.8
106
130
104
138
131
BVTT3×6
103
105
139
140
BVTT3×6
104
135
102
103
101
136
137

Ref.No	Part No.	Description	Remark
101	3-745-319-01	ROLLER, PRESS	
102	*3-173-562-02	SHAFT, PRESS	
103	*3-173-979-01	HOLDER, PRESS	
104	3-173-563-02	SPRING (PRESS), TENSION	
105	1-500-197-11	HEAD, THERMAL (LV5414)	
106	*3-173-564-01	HOLDER, SHEET	
107	*3-174-266-02	SHEET, GUIDE	
108	1-769-536-11	WIRE(FLAT TYPE)(26 CORE)	
109	*3-173-980-01	HOLDER, HEAD	
110	3-173-978-01	SPRING (B), COMPRESSION	
111	3-173-977-02	SPRING (S), COMPRESSION	
112	*3-187-314-01	HOLDER, SPRING	
113	3-173-547-01	SHAFT, HEAD	
114	3-173-579-01	BEARING, PLATEN	
115	3-173-578-02	PULLEY, PLATEN	
116	3-174-267-02	BELT, 110 TN	
117	3-173-615-02	PLATEN	
118	3-741-062-11	STAY, ROLL	
119	3-173-561-01	SPRING (BELT), TENSION	
120	3-173-616-02	PULLEY (P), GEAR	
121	3-173-566-01	GEAR (A)	
122	3-173-581-01	GEAR (G), IDLER	
123	*X-3166-383-4	BRACKET ASSY, GEAR	
124	3-173-557-02	BEARING, ARM	
125	3-173-612-02	ARM (L)	
126	3-173-610-02	PIPE, ARM	
127	3-173-611-01	ARM (R)	
128	*1-655-125-11	PC BOARD SU-20	
129	*X-3166-382-2	BRACKET ASSY, MOTOR	
130	X-3166-426-2	MOTOR ASSY, M GEAR	
131	*1-641-591-11	PC BOARD SE-9	
132	X-3167-651-1	FG UNIT	
133	3-173-565-01	GEAR (M), IDLER	
134	3-173-566-01	GEAR (A)	
135	*1-655-123-11	PC BOARD C-19	
136	*X-3166-434-2	LINK ASSY, HEAD	
137	*X-3166-384-4	CHASSIS (OUTSERT) ASSY, MECH	
138	*3-173-620-01	CHASSIS, INNER	
139	*1-655-124-11	PC BOARD PTC-35	
140	*3-187-939-01	SHEET PROTECTION, PTC	
141	4-034-937-01	SCREW (M3), TAPPING	
142	X-3167-781-1 X-3167-782-1	TRAY ASSY (E), SLIDE (for UC, CE) TRAY ASSY (J), SLIDE (for J)	

SECTION 7
ELECTRICAL PARTS LIST

C-19 **LE-11** **MA-19**

NOTE:

- Items marked "*" are not stocked because they are seldom required for routine servicing. Some delay should be expected when ordering these items.
- All variable and adjustable resistors have characteristic curve B, unless otherwise stated.

RESISTORS
- All resistors are in ohms
- F:non-flammable

When indicating part by reference number, please include the board name.

CAPACITORS
- MF: μF, PF: μμF

COILS
- MMH: mH, UH: μH

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifies par une trame et une marque ⚠ sont critiques pour la securite.
Ne les remplacer que par une piece portant le numero specifie.

Ref.No	Part No.	Description			Remark
	*1-655-123-11	C-19 BOARD **********			
		<CONNECTOR>			
CN511	*1-954-381-11	HARNESS, SUB (I)			
		<DIODE>			
D511	8-749-923-97	PHOTO INTERRUPTER GP2S40K			
D512	8-749-923-97	PHOTO INTERRUPTER GP2S40K			
		<RESISTOR>			
R511	1-216-035-00	METAL	270	5%	1/10W
R512	1-216-035-00	METAL	270	5%	1/10W
**					
	*1-655-126-11	LE-11 BOARD ***********			
	3-689-205-02	"HOLDER (A), LED"			
		<CONNECTOR>			
CN521	*1-949-470-11	HARNESS (D)			
		<DIODE>			
D521	8-719-945-20	DIODE GL-520			
		<RESISTOR>			
R521	1-216-295-91	CONDUCTOR 2012			
**					
	*A-8265-924-A	MA-19 BOARD, COMPLETE *********************			
		<BUZZER>			
BZ301	1-529-080-11	BUZZER, PIEZOELECTRIC			
		<CAPACITOR>			
C1	1-126-923-11	ELECT	220uF	20%	10V
C2	1-104-664-11	ELECT	47uF	20%	25V
C3	1-163-220-11	CERAMIC	3PF		50V
C4	1-163-085-00	CERAMIC	2PF		50V
C5	1-163-222-11	CERAMIC	5PF		50V
C6	1-163-038-91	CERAMIC	0.1uF		25V
C7	1-126-111-11	ELECT	3.3uF	20%	50V
C8	1-163-038-91	CERAMIC	0.1uF		25V
C9	1-163-038-91	CERAMIC	0.1uF		25V
C10	1-163-038-91	CERAMIC	0.1uF		25V
C11	1-163-227-11	CERAMIC	10PF		50V
C12	1-163-227-11	CERAMIC	10PF		50V
C13	1-104-664-11	ELECT	47uF	20%	25V

Ref.No	Part No.	Description			Remark
C14	1-163-235-11	CERAMIC	22PF	5%	50V
C15	1-163-235-11	CERAMIC	22PF	5%	50V
C16	1-163-235-11	CERAMIC	22PF	5%	50V
C17	1-126-111-11	ELECT	3.3uF	20%	50V
C18	1-164-232-11	CHIP CERAMIC	0.01uF	10%	50V
C19	1-124-903-11	ELECT	1uF	20%	50V
C20	1-164-161-11	CERAMIC	0.0022uF	10%	50V
C21	1-126-964-11	ELECT	10uF	20%	50V
C22	1-124-916-11	ELECT	22uF	20%	25V
C23	1-163-038-91	CERAMIC	0.1uF		25V
C24	1-163-038-91	CERAMIC	0.1uF		25V
C25	1-124-903-11	ELECT	1uF	20%	50V
C26	1-124-903-11	ELECT	1uF	20%	50V
C27	1-124-903-11	ELECT	1uF	20%	50V
C28	1-126-923-11	ELECT	220uF	20%	10V
C29	1-163-038-91	CERAMIC	0.1uF		25V
C30	1-163-038-91	CERAMIC	0.1uF		25V
C31	1-124-903-11	ELECT	1uF	20%	50V
C32	1-124-903-11	ELECT	1uF	20%	50V
C33	1-164-232-11	CERAMIC	0.01uF	10%	50V
C50	1-163-038-91	CERAMIC	0.1uF		25V
C51	1-104-664-11	ELECT	47uF	20%	25V
C54	1-163-038-91	CERAMIC	0.1uF		25V
C55	1-126-964-11	ELECT	10uF	20%	50V
C93	1-104-664-11	ELECT	47uF	20%	25V
C94	1-104-664-11	ELECT	47uF	20%	25V
C95	1-164-004-11	CERAMIC	0.1uF	10%	25V
C96	1-164-004-11	CERAMIC	0.1uF	10%	25V
C97	1-104-664-11	ELECT	47uF	20%	25V
C98	1-163-038-91	CERAMIC	0.1uF		25V
C99	1-126-964-11	ELECT	10uF	20%	50V
C101	1-163-097-00	CERAMIC	15PF	5%	50V
C102	1-163-097-00	CERAMIC	15PF	5%	50V
C103	1-163-239-11	CERAMIC	33PF	5%	50V
C104	1-163-239-11	CERAMIC	33PF	5%	50V
C105	1-163-239-11	CERAMIC	33PF	5%	50V
C106	1-163-121-00	CERAMIC	150PF	5%	50V
C107	1-163-263-11	CERAMIC	330PF	5%	50V
C109	1-126-964-11	ELECT	10uF	20%	50V
C110	1-163-038-91	CERAMIC	0.1uF		25V
C112	1-163-038-91	CERAMIC	0.1uF		25V
C113	1-126-964-11	ELECT	10uF	20%	50V
C114	1-163-038-91	CERAMIC	0.1uF		25V
C115	1-104-664-11	ELECT	47uF	20%	25V
C116	1-104-664-11	ELECT	47uF	20%	25V
C117	1-163-038-91	CERAMIC	0.1uF		25V
C118	1-163-038-91	CERAMIC	0.1uF		25V
C119	1-163-038-91	CERAMIC	0.1uF		25V
C120	1-163-038-91	CERAMIC	0.1uF		25V
C121	1-163-038-91	CERAMIC	0.1uF		25V
C122	1-163-038-91	CERAMIC	0.1uF		25V
C123	1-163-038-91	CERAMIC	0.1uF		25V

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Ref.No	Part No.	Description			Remark
C124	1-163-038-91	CERAMIC	0.1uF		25V
C125	1-163-038-91	CERAMIC	0.1uF		25V
C126	1-163-038-91	CERAMIC	0.1uF		25V
C127	1-163-038-91	CERAMIC	0.1uF		25V
C128	1-163-038-91	CERAMIC	0.1uF		25V
C129	1-163-038-91	CERAMIC	0.1uF		25V
C130	1-163-038-91	CERAMIC	0.1uF		25V
C131	1-163-038-91	CERAMIC	0.1uF		25V
C132	1-163-038-91	CERAMIC	0.1uF		25V
C133	1-163-038-91	CERAMIC	0.1uF		25V
C134	1-163-038-91	CERAMIC	0.1uF		25V
C136	1-163-243-91	CHIP CERAMIC	47P	5%	50V
C137	1-163-243-91	CHIP CERAMIC	47P	5%	50V
C201	1-130-489-00	MYLAR	0.033uF	5%	50V
C202	1-163-038-91	CERAMIC	0.1uF		25V
C203	1-126-964-11	ELECT	10uF	20%	50V
C204	1-164-004-11	CERAMIC	0.1uF	10%	25V
C205	1-124-927-11	ELECT	4.7uF	20%	50V
C206	1-126-964-11	ELECT	10uF	20%	50V
C207	1-126-964-11	ELECT	10uF	20%	50V
C208	1-126-964-11	ELECT	10uF	20%	50V
C209	1-164-232-11	CERAMIC	0.01uF	10%	50V
C210	1-164-232-11	CERAMIC	0.01uF	10%	50V
C301	1-163-033-91	CERAMIC	0.022uF		50V
C302	1-164-232-11	CERAMIC	0.01uF	10%	50V
C307	1-104-664-11	ELECT	47uF	20%	25V
C308	1-126-966-11	ELECT	33uF	20%	50V
C309	1-163-038-91	CERAMIC	0.1uF		25V
C340	1-164-232-11	CERAMIC	0.01uF	10%	50V
C341	1-164-232-11	CERAMIC	0.01uF	10%	50V
C342	1-164-232-11	CERAMIC	0.01uF	10%	50V
C343	1-164-232-11	CERAMIC	0.01uF	10%	50V
C344	1-164-232-11	CERAMIC	0.01uF	10%	50V
C346	1-163-038-91	CERAMIC	0.1uF		25V
C351	1-163-038-91	CERAMIC	0.1uF		25V
C352	1-126-964-11	ELECT	10uF	20%	50V
C353	1-163-038-91	CERAMIC	0.1uF		25V
C354	1-126-964-11	ELECT	10uF	20%	50V
C355	1-163-038-91	CERAMIC	0.1uF		25V
C356	1-163-038-91	CERAMIC	0.1uF		25V
C357	1-104-664-11	ELECT	47uF	20%	25V
C358	1-164-232-11	CERAMIC	0.01uF	10%	50V
C359	1-164-232-11	CERAMIC	0.01uF	10%	50V
C360	1-164-232-11	CERAMIC	0.01uF	10%	50V
C361	1-164-232-11	CERAMIC	0.01uF	10%	50V
C362	1-164-232-11	CERAMIC	0.01uF	10%	50V
C363	1-164-232-11	CERAMIC	0.01uF	10%	50V
C364	1-164-232-11	CERAMIC	0.01uF	10%	50V
C365	1-164-232-11	CERAMIC	0.01uF	10%	50V
C366	1-164-232-11	CERAMIC	0.01uF	10%	50V
C367	1-164-232-11	CERAMIC	0.01uF	10%	50V
		<CONNECTOR>			
CN1	1-691-431-11	CONNECTOR ASSY, BNC			
CN2	1-569-536-11	SOCKET, CONNECTOR 7P			
CN3	*1-564-005-11	PIN, CONNECTOR 6P			
CN101	*1-764-781-11	SOCKET, CONNECTOR 26P			
CN102	*1-764-781-11	SOCKET, CONNECTOR 26P			
CN201	1-506-469-11	PIN, CONNECTOR 4P			
CN202	1-506-471-11	PIN, CONNECTOR 6P			
CN301	1-562-719-11	SOCKET, CONNECTOR 10P			
CN302	*1-564-007-11	PIN, CONNECTOR 8P			
CN303	*1-506-468-11	PIN, CONNECTOR 3P			
CN304	*1-564-001-11	PIN, CONNECTOR 2P			
CN305	1-506-467-11	PIN, CONNECTOR 2P			

Ref.No	Part No.	Description	Remark
CN306	1-569-536-11	SOCKET, CONNECTOR 7P	
CN307	1-506-469-11	PIN, CONNECTOR 4P	
		<DIODE>	
D1	8-719-801-78	DIODE 1SS184	
D2	8-719-801-78	DIODE 1SS184	
D3	8-719-801-78	DIODE 1SS184	
D301	8-719-801-78	DIODE 1SS184	
D302	8-719-801-78	DIODE 1SS184	
D303	8-719-801-78	DIODE 1SS184	
D304	8-719-801-78	DIODE 1SS184	
D305	8-719-801-78	DIODE 1SS184	
D306	8-719-801-78	DIODE 1SS184	
D307	8-719-801-78	DIODE 1SS184	
D308	8-719-801-78	DIODE 1SS184	
		<FERRITE BEAD>	
FB1	1-410-397-21	FERRITE BEAD INDUCTOR 1.1UH	
FB2	1-410-397-21	FERRITE BEAD INDUCTOR 1.1UH	
FB101	1-410-397-21	FERRITE BEAD INDUCTOR 1.1UH	
		<FILTER>	
FL1	1-760-578-11	FILTER, CERAMIC	
FL2	1-579-348-11	FILTER, CERAMIC	
FL3	1-236-129-11	NCAPSULATED COMPONENT	
FL4	1-410-397-21	FERRITE BEAD INDUCTOR 1.1UH	
FL5	1-410-397-21	FERRITE BEAD INDUCTOR 1.1UH	
FL301	1-236-129-11	NCAPSULATED COMPONENT	
FL302	1-408-397-00	INDUCTOR 1UH	
FL303	1-408-397-00	INDUCTOR 1UH	
		<IC>	
IC1	8-759-304-10	IC HA11465A	
IC2	8-759-300-71	IC HD14053BFP	
IC3	8-759-051-50	IC TL5501CDWA	
IC4	8-759-051-51	IC MB40776PF	
IC5	8-759-231-58	IC TA7812S	
IC101	8-759-287-50	IC CXD8932Q	
IC102	8-759-925-90	IC SN74HC74ANS	
IC103	8-759-292-87	IC CXD8938Q	
IC104	8-759-292-88	IC HM514280AJ-7	
IC201	8-759-051-52	IC M51970L	
IC202	8-759-600-24	IC M54543L	
IC203	8-759-600-24	IC M54543L	
IC204	8-759-633-10	IC M54544AL	
IC301	8-752-860-72	IC CXP80P116Q-2-256	
IC302	8-759-983-69	IC LM358PS	
IC303	8-759-925-80	IC SN74HC14ANS	
IC304	8-759-278-46	IC PST600DMT-T1	
		<JACK>	
J301	1-507-967-11	JACK	
		<INDUCTOR>	
L1	1-408-777-00	INDUCTOR CHIP 10UH	
L3	1-408-765-21	INDUCTOR CHIP 1UH	
L4	1-410-391-11	INDUCTOR CHIP 68UH	
L5	1-410-391-11	INDUCTOR CHIP 68UH	
L301	1-408-777-00	INDUCTOR CHIP 10UH	
		<TTRANSISTOR>	
Q1	8-729-230-49	TRANSISTOR 2SC2712-YG	
Q2	8-729-216-22	TRANSISTOR 2SA1162-G	
Q3	8-729-216-22	TRANSISTOR 2SA1162-G	
Q4	8-729-230-49	TRANSISTOR 2SC2712-YG	

Ref.No	Part No.	Description			Remark
Q5	8-729-230-49	TRANSISTOR 2SC2712-YG			
Q6	8-729-230-49	TRANSISTOR 2SC2712-YG			
Q7	8-729-216-22	TRANSISTOR 2SA1162-G			
Q8	8-729-230-49	TRANSISTOR 2SC2712-YG			
Q9	8-729-230-49	TRANSISTOR 2SC2712-YG			
Q10	8-729-230-49	TRANSISTOR 2SC2712-YG			
Q11	8-729-230-49	TRANSISTOR 2SC2712-YG			
Q12	8-729-230-49	TRANSISTOR 2SC2712-YG			
Q13	8-729-230-49	TRANSISTOR 2SC2712-YG			
Q14	8-729-230-49	TRANSISTOR 2SC2712-YG			
Q15	8-729-216-22	TRANSISTOR 2SA1162-G			
Q16	8-729-230-49	TRANSISTOR 2SC2712-YG			
Q17	8-729-230-49	TRANSISTOR 2SC2712-YG			
Q18	8-729-230-49	TRANSISTOR 2SC2712-YG			
Q19	8-729-901-00	TRANSISTOR DTC124EK			
Q20	8-729-230-49	TRANSISTOR 2SC2712-YG			
Q21	8-729-230-49	TRANSISTOR 2SC2712-YG			
Q22	8-729-230-49	TRANSISTOR 2SC2712-YG			
Q23	8-729-230-49	TRANSISTOR 2SC2712-YG			
Q201	8-729-901-05	TRANSISTOR DTA124EK			
Q202	8-729-901-05	TRANSISTOR DTA124EK			
Q203	8-729-216-22	TRANSISTOR 2SA1162-G			
Q204	8-729-230-49	TRANSISTOR 2SC2712-YG			
Q205	8-729-101-07	TRANSISTOR 2SB798-DL			
Q206	8-729-140-75	TRANSISTOR 2SD999-CLCK			
Q207	8-729-140-75	TRANSISTOR 2SD999-CLCK			
Q301	8-729-901-00	TRANSISTOR DTC124EK			
Q302	8-729-900-53	TRANSISTOR DTC114EK			
Q303	8-729-230-49	TRANSISTOR 2SC2712-YG			
Q304	8-729-901-00	TRANSISTOR DTC124EK			
		<RESISTOR>			
R1	1-216-029-00	METAL	150	5%	1/10W
R2	1-216-029-00	METAL	150	5%	1/10W
R3	1-216-073-00	METAL	10K	5%	1/10W
R4	1-216-073-00	METAL	10K	5%	1/10W
R5	1-216-025-00	METAL	100	5%	1/10W
R6	1-216-049-00	METAL	1K	5%	1/10W
R7	1-216-039-00	METAL	390	5%	1/10W
R8	1-216-043-91	METAL	560	5%	1/10W
R9	1-216-049-00	METAL	1K	5%	1/10W
R10	1-216-039-00	METAL	390	5%	1/10W
R11	1-216-043-91	METAL	560	5%	1/10W
R12	1-216-049-00	METAL	1K	5%	1/10W
R13	1-216-025-00	METAL	100	5%	1/10W
R14	1-216-073-00	METAL	10K	5%	1/10W
R15	1-216-073-00	METAL	10K	5%	1/10W
R16	1-216-049-00	METAL	1K	5%	1/10W
R17	1-216-025-00	METAL	100	5%	1/10W
R18	1-216-065-00	METAL	4.7K	5%	1/10W
R20	1-216-095-00	METAL	82K	5%	1/10W
R21	1-216-077-00	METAL	15K	5%	1/10W
R22	1-216-067-00	METAL	5.6K	5%	1/10W
R23	1-216-077-00	METAL	15K	5%	1/10W
R24	1-216-069-00	METAL	6.8K	5%	1/10W
R25	1-216-073-00	METAL	10K	5%	1/10W
R26	1-216-069-00	METAL	6.8K	5%	1/10W
R27	1-216-049-00	METAL	1K	5%	1/10W
R28	1-216-035-00	METAL	270	5%	1/10W
R29	1-216-071-00	METAL	8.2K	5%	1/10W
R30	1-216-079-00	METAL	18K	5%	1/10W
R31	1-216-049-00	METAL	1K	5%	1/10W
R32	1-216-049-00	METAL	1K	5%	1/10W
R33	1-216-071-00	METAL	8.2K	5%	1/10W
R34	1-216-079-00	METAL	18K	5%	1/10W

Ref.No	Part No.	Description			Remark
R35	1-216-057-00	METAL	2.2K	5%	1/10W
R36	1-216-053-00	METAL	1.5K	5%	1/10W
R37	1-216-071-00	METAL	8.2K	5%	1/10W
R38	1-216-061-00	METAL	3.3K	5%	1/10W
R39	1-216-057-00	METAL	2.2K	5%	1/10W
R40	1-216-041-00	METAL	470	5%	1/10W
R41	1-216-041-00	METAL	470	5%	1/10W
R42	1-216-049-00	METAL	1K	5%	1/10W
R43	1-216-045-00	METAL	680	5%	1/10W
R44	1-216-045-00	METAL	680	5%	1/10W
R45	1-216-045-00	METAL	680	5%	1/10W
R46	1-216-049-00	METAL	1K	5%	1/10W
R47	1-216-033-00	METAL	220	5%	1/10W
R48	1-216-037-00	METAL	330	5%	1/10W
R49	1-216-049-00	METAL	1K	5%	1/10W
R50	1-216-073-00	METAL	10K	5%	1/10W
R51	1-216-057-00	METAL	2.2K	5%	1/10W
R52	1-216-073-00	METAL	10K	5%	1/10W
R53	1-216-023-00	METAL	82	5%	1/10W
R54	1-216-119-00	METAL	820K	5%	1/10W
R55	1-216-081-00	METAL	22K	5%	1/10W
R56	1-216-065-00	METAL	4.7K	5%	1/10W
R57	1-216-055-00	METAL	1.8K	5%	1/10W
R58	1-216-073-00	METAL	10K	5%	1/10W
R59	1-216-045-00	METAL	680	5%	1/10W
R59	1-216-069-00	METAL	6.8K	5%	1/10W
R60	1-216-049-00	METAL	1K	5%	1/10W
R61	1-216-065-00	METAL	4.7K	5%	1/10W
R62	1-216-041-00	METAL	470	5%	1/10W
R63	1-216-049-00	METAL	1K	5%	1/10W
R64	1-216-063-00	METAL	3.9K	5%	1/10W
R65	1-216-053-00	METAL	1.5K	5%	1/10W
R66	1-216-061-00	METAL	3.3K	5%	1/10W
R67	1-216-049-00	METAL	1K	5%	1/10W
R68	1-216-057-00	METAL	2.2K	5%	1/10W
R69	1-216-063-00	METAL	3.9K	5%	1/10W
R70	1-216-057-00	METAL	2.2K	5%	1/10W
R71	1-216-021-00	METAL	68	5%	1/10W
R72	1-216-075-00	METAL	12K	5%	1/10W
R73	1-216-067-00	METAL	5.6K	5%	1/10W
R74	1-216-033-00	METAL	220	5%	1/10W
R75	1-216-021-00	METAL	68	5%	1/10W
R76	1-216-073-00	METAL	10K	5%	1/10W
R77	1-216-069-00	METAL	6.8K	5%	1/10W
R80	1-216-051-00	METAL	1.2K	5%	1/10W
R81	1-216-057-00	METAL	2.2K	5%	1/10W
R82	1-216-057-00	METAL	2.2K	5%	1/10W
R83	1-216-071-00	METAL	8.2K	5%	1/10W
R84	1-216-067-00	METAL	5.6K	5%	1/10W
R85	1-216-049-00	METAL	1K	5%	1/10W
R86	1-216-051-00	METAL	1.2K	5%	1/10W
R87	1-216-057-00	METAL	2.2K	5%	1/10W
R88	1-216-057-00	METAL	2.2K	5%	1/10W
R89	1-216-071-00	METAL	8.2K	5%	1/10W
R90	1-216-067-00	METAL	5.6K	5%	1/10W
R91	1-216-049-00	METAL	1K	5%	1/10W
R95	1-216-033-00	METAL	220	5%	1/10W
R98	1-216-313-00	METAL	8.2	5%	1/10W
R99	1-216-313-00	METAL	8.2	5%	1/10W
R101	1-216-121-00	METAL	1M	5%	1/10W
R102	1-216-121-00	METAL	1M	5%	1/10W
R103	1-216-013-00	METAL	33	5%	1/10W
R104	1-216-013-00	METAL	33	5%	1/10W
R105	1-216-013-00	METAL	33	5%	1/10W
R106	1-216-025-00	METAL	100	5%	1/10W

Ref.No	Part No.	Description			Remark
R107	1-216-025-00	METAL	100	5%	1/10W
R108	1-216-037-90	METAL	330	5%	1/10W
R108	1-216-041-00	METAL	470	5%	1/10W
R110	1-216-073-00	METAL	10K	5%	1/10W
R111	1-216-073-00	METAL	10K	5%	1/10W
R112	1-216-073-00	METAL	10K	5%	1/10W
R113	1-216-073-00	METAL	10K	5%	1/10W
R114	1-216-073-00	METAL	10K	5%	1/10W
R115	1-216-073-00	METAL	10K	5%	1/10W
R116	1-216-073-00	METAL	10K	5%	1/10W
R117	1-216-073-00	METAL	10K	5%	1/10W
R118	1-216-073-00	METAL	10K	5%	1/10W
R120	1-216-025-00	METAL	100	5%	1/10W
R121	1-216-025-00	METAL	100	5%	1/10W
R122	1-216-025-00	METAL	100	5%	1/10W
R123	1-216-025-00	METAL	100	5%	1/10W
R124	1-216-025-00	METAL	100	5%	1/10W
R125	1-216-025-00	METAL	100	5%	1/10W
R126	1-216-025-00	METAL	100	5%	1/10W
R127	1-216-025-00	METAL	100	5%	1/10W
R128	1-216-025-00	METAL	100	5%	1/10W
R129	1-216-025-00	METAL	100	5%	1/10W
R130	1-216-025-00	METAL	100	5%	1/10W
R131	1-216-025-00	METAL	100	5%	1/10W
R132	1-216-025-00	METAL	100	5%	1/10W
R133	1-216-025-00	METAL	100	5%	1/10W
R134	1-216-025-00	METAL	100	5%	1/10W
R135	1-216-025-00	METAL	100	5%	1/10W
R136	1-216-025-00	METAL	100	5%	1/10W
R137	1-216-025-00	METAL	100	5%	1/10W
R138	1-216-025-00	METAL	100	5%	1/10W
R139	1-216-025-00	METAL	100	5%	1/10W
R140	1-216-025-00	METAL	100	5%	1/10W
R141	1-216-025-00	METAL	100	5%	1/10W
R142	1-216-025-00	METAL	100	5%	1/10W
R143	1-216-025-00	METAL	100	5%	1/10W
R144	1-216-025-00	METAL	100	5%	1/10W
R145	1-216-025-00	METAL	100	5%	1/10W
R146	1-216-025-00	METAL	100	5%	1/10W
R147	1-216-025-00	METAL	100	5%	1/10W
R148	1-216-025-00	METAL	100	5%	1/10W
R149	1-216-295-91	CONDUCTOR 2012			
R150	1-216-295-91	CONDUCTOR 2012			
R151	1-216-295-91	CONDUCTOR 2012			
R152	1-216-295-91	CONDUCTOR 2012			
R153	1-216-025-00	METAL	100	5%	1/10W
R154	1-216-025-00	METAL	100	5%	1/10W
R156	1-216-295-91	CONDUCTOR 2012			
R157	1-216-295-91	CONDUCTOR 2012			
R201	1-216-099-00	METAL	120K	5%	1/10W
R202	1-216-091-00	METAL	56K	5%	1/10W
R203	1-216-081-00	METAL	22K	5%	1/10W
R204	1-216-013-00	METAL	33	5%	1/10W
R205	1-216-093-00	METAL	68K	5%	1/10W
R206	1-216-033-00	METAL	220	5%	1/10W
R207	1-216-057-00	METAL	2.2K	5%	1/10W
R208	1-216-059-00	METAL	2.7K	5%	1/10W
R210	1-216-295-91	CONDUCTOR 2012			
R211	1-216-045-00	METAL	680	5%	1/10W
R212	1-216-308-00	METAL	4.7	5%	1/10W
R213	1-216-308-00	METAL	4.7	5%	1/10W
R214	1-216-049-00	METAL	1K	5%	1/10W
R215	1-216-055-00	METAL	1.8K	5%	1/10W
R216	1-216-061-00	METAL	3.3K	5%	1/10W
R217	1-216-065-00	METAL	4.7K	5%	1/10W
R218	1-216-069-00	METAL	6.8K	5%	1/10W
R219	1-216-069-00	METAL	6.8K	5%	1/10W
R220	1-216-069-00	METAL	6.8K	5%	1/10W
R221	1-216-001-00	METAL	10	5%	1/10W
R222	1-216-001-00	METAL	10	5%	1/10W
R223	1-216-001-00	METAL	10	5%	1/10W
R224	1-216-001-00	METAL	10	5%	1/10W
R300	1-216-065-00	METAL	4.7K	5%	1/10W
R301	1-216-061-00	METAL	3.3K	5%	1/10W
R302	1-216-037-00	METAL	330	5%	1/10W
R303	1-216-037-00	METAL	330	5%	1/10W
R304	1-216-051-00	METAL	1.2K	5%	1/10W
R305	1-216-073-00	METAL	10K	5%	1/10W
R306	1-216-023-00	METAL	82	5%	1/10W
R307	1-216-101-00	METAL	150K	5%	1/10W
R308	1-216-077-00	METAL	15K	5%	1/10W
R309	1-216-081-00	METAL	22K	5%	1/10W
R310	1-216-097-00	METAL	100K	5%	1/10W
R311	1-216-063-00	METAL	3.9K	5%	1/10W
R312	1-216-073-00	METAL	10K	5%	1/10W
R313	1-216-073-00	METAL	10K	5%	1/10W
R314	1-216-049-00	METAL	1K	5%	1/10W
R315	1-216-049-00	METAL	1K	5%	1/10W
R316	1-216-037-00	METAL	330	5%	1/10W
R317	1-216-083-00	METAL	27K	5%	1/10W
R318	1-216-067-00	METAL	5.6K	5%	1/10W
R319	1-216-061-00	METAL	3.3K	5%	1/10W
R320	1-216-061-00	METAL	3.3K	5%	1/10W
R321	1-216-033-00	METAL	220	5%	1/10W
R322	1-216-061-00	METAL	3.3K	5%	1/10W
R323	1-216-025-00	METAL	100	5%	1/10W
R324	1-216-025-00	METAL	100	5%	1/10W
R325	1-216-041-00	METAL	470	5%	1/10W
R326	1-216-055-00	METAL	1.8K	5%	1/10W
R329	1-216-073-00	METAL	10K	5%	1/10W
R330	1-216-073-00	METAL	10K	5%	1/10W
R331	1-216-049-00	METAL	1K	5%	1/10W
R332	1-216-049-00	METAL	1K	5%	1/10W
R333	1-216-049-00	METAL	1K	5%	1/10W
R334	1-216-049-00	METAL	1K	5%	1/10W
R335	1-216-073-00	METAL	10K	5%	1/10W
R336	1-216-073-00	METAL	10K	5%	1/10W
R337	1-216-073-00	METAL	10K	5%	1/10W
R338	1-216-073-00	METAL	10K	5%	1/10W
R339	1-216-073-00	METAL	10K	5%	1/10W
R340	1-216-073-00	METAL	10K	5%	1/10W
R341	1-216-073-00	METAL	10K	5%	1/10W
R342	1-216-073-00	METAL	10K	5%	1/10W
R343	1-216-073-00	METAL	10K	5%	1/10W
R346	1-216-073-00	METAL	10K	5%	1/10W
R347	1-216-073-00	METAL	10K	5%	1/10W
R348	1-216-073-00	METAL	10K	5%	1/10W
R349	1-216-**842-01**	**RESISTOR, CHIP**	**56K**		**1/16W (1608**
R350	1-216-**842-01**	**RESISTOR, CHIP**	**56K**		**1/16W (1608**
R351	1-216-**842-01**	**RESISTOR, CHIP**	**56K**		**1/16W (1608**
R352	1-216-**842-01**	**RESISTOR, CHIP**	**56K**		**1/16W (1608**
R353	1-216-073-00	METAL	10K	5%	1/10W
R354	1-216-073-00	METAL	10K	5%	1/10W
R355	1-216-073-00	METAL	10K	5%	1/10W
R356	1-216-073-00	METAL	10K	5%	1/10W
R361	1-216-049-00	METAL	1K	5%	1/10W
R362	1-216-049-00	METAL	1K	5%	1/10W
R363	1-216-049-00	METAL	1K	5%	1/10W
R364	1-216-049-00	METAL	1K	5%	1/10W
R365	1-216-049-00	METAL	1K	5%	1/10W

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifies par une trame et une marque ⚠ sont critiques pour la securite.
Ne les remplacer que par une piece portant le numero specifie.

Ref.No	Part No.	Description			Remark
R366	1-216-049-00	METAL	1K	5%	1/10W
R367	1-216-049-00	METAL	1K	5%	1/10W
R368	1-216-049-00	METAL	1K	5%	1/10W
R369	1-216-049-00	METAL	1K	5%	1/10W
R370	1-216-049-00	METAL	1K	5%	1/10W
R371	1-216-073-00	METAL	10K	5%	1/10W
R372	1-216-073-00	METAL	10K	5%	1/10W
R373	1-216-073-00	METAL	10K	5%	1/10W
R374	1-216-073-00	METAL	10K	5%	1/10W
R375	1-216-073-00	METAL	10K	5%	1/10W
R376	1-216-073-00	METAL	10K	5%	1/10W
R377	1-216-073-00	METAL	10K	5%	1/10W
R378	1-216-073-00	METAL	10K	5%	1/10W
R379	1-216-073-00	METAL	10K	5%	1/10W
R380	1-216-073-00	METAL	10K	5%	1/10W
R381	1-412-390-21	CONDUCTOR OUH			
R382	1-412-390-21	CONDUCTOR OUH			
		<VARIABLE RESISTOR>			
RV1	1-241-175-11	RES, ADJ, CERMET 220			
RV2	1-238-090-11	RES, ADJ, CERMET 10K			
RV201	1-241-092-11	RES, ADJ, CERMET 47K			
		<RELAY>			
RY1	1-515-614-11	RELAY			
		<SWITCH>			
S301	1-572-999-11	SWITCH, SLIDE			
S302	1-762-299-11	SWITCH, DIP (PIANO TYPE)			
S303	1-572-999-11	SWITCH, SLIDE			
		<CRYSTAL>			
X101	1-760-094-11	VIBRATOR, CRYSTAL			
X301	1-579-125-11	VIBRATOR, CERAMIC			

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Ref.No	Part No.	Description			Remark
	*1-655-124-11	PTC-35 BOARD ************			
	3-187-312-01	HOLDER (P), LED			
		<CAPASITOR>			
C501	1-163-038-91	CERAMIC	0.1uF		25V
C502	1-163-038-91	CERAMIC	0.1uF		25V
		<CONNECTOR>			
CN501	*1-949-469-11	HARNESS (C)			
		<TRANSISTOR>			
Q501	8-719-988-59	TRANSISTOR PT501A			
Q502	8-729-019-26	TRANSISTOR PT493F			
		<RESISTOR>			
R501	1-216-025-00	METAL	100	5%	1/10W
R502	1-216-013-00	METAL	33	5%	1/10W
R503	1-216-295-91	CONDUCTOR 2012			

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Ref.No	Part No.	Description	Remark
	*1-641-592-11	SE-9 BOARD **********	
SUM3	1-690-506-11	CORE, FLAT TYPE (7 CORE)	

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Ref.No	Part No.	Description	Remark
	*1-655-125-11	SU-20 BOARD ***********	
		<CONNECTOR>	
CN601	1-506-481-11	PIN, CONNECTOR 2P	

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Ref.No	Part No.	Description		Remark
	⚠*1-468-002-11	SWITCHING REGULATOR (SOPS-1088) *******************************		
	*2-409-035-01	CASE, ASSY		
	*1-954-340-11	HARNESS		
	*1-655-574-11	C BOARD *******		
		<CAPACITOR>		
C181	1-137-169-00	FILM	0.22uF	50V
C182	1-136-153-00	FILM	0.01uF	50V
C183	1-130-471-00	FILM	1000PF	50V
C184	1-137-171-00	FILM	0.33uF	50V
C185	1-124-478-11	ELECT	100uF	25V
C601	1-164-331-91	CERAMIC	470PF	500V
C602	1-164-331-91	CERAMIC	470PF	500V
C607	1-136-165-00	FILM	0.1uF	50V
C611	1-136-165-00	FILM	0.1uF	50V
C612	1-137-171-00	FILM	0.33uF	50V
C616	1-136-153-00	FILM	0.01uF	50V
C617	1-136-165-00	FILM	0.1uF	50V
C618	1-136-153-00	FILM	0.01uF	50V
C619	1-130-012-00	FILM	330PF	50V
C620	1-136-165-00	FILM	0.1uF	50V
C621	1-136-153-00	FILM	0.01uF	50V
		<CONNECTOR>		
CN102	*1-770-420-11	CONNECTOR 9P		
CN103	*1-770-420-11	CONNECTOR 9P		
		<DIODE>		
D1	8-719-210-21	DIODE 11EQS04		
D601	8-719-210-21	DIODE 11EQS04		
D602	8-719-210-21	DIODE 11EQS04		
D603	8-719-911-19	DIODE 1SS119		
D605	8-719-929-15	DIODE HZS9.1NB2		
D606	8-719-986-73	DIODE RB441QT-77		
D607	8-719-986-73	DIODE RB441QT-77		
D610	8-719-929-72	DIODE HZS33NB2		
		<IC>		
IC101	8-759-112-09	IC UPC78N12H		
IC102	8-759-332-30	IC MC34262P		
IC103	8-759-332-29	IC M51945BL		
IC601	8-759-298-87	IC CXA8038P		
		<TRANSISTOR>		
Q151	8-729-199-82	TRANSISTOR 2SD774-2		
Q601	8-729-205-02	TRANSISTOR 2SB810-H		
Q602	8-729-205-02	TRANSISTOR 2SB810-H		
Q603	8-729-199-82	TRANSISTOR 2SD774-2		
Q604	8-729-900-80	TRANSISTOR DTC114ES		
		<RESISTOR>		
R181	1-247-863-91	CARBON	22K	1/4W
R182	1-249-431-11	CARBON	15K	1/4W
R183	1-249-401-11	CARBON	47	1/4W

SWITCHING REGULATOR

Ref.No	Part No.	Description		Remark
R184	1-249-427-11	CARBON	6.8K	1/4W
R185	1-249-437-11	CARBON	47K	1/4W
R186	1-249-441-11	CARBON	100K	1/4W
R187	1-247-425-11	CARBON	4.7K	1/4W
R601	1-249-389-11	CARBON	4.7	1/4W
R602	1-247-425-11	CARBON	4.7K	1/4W
R603	1-249-389-11	CARBON	4.7	1/4W
R604	1-247-425-11	CARBON	4.7K	1/4W
R605	1-247-791-91	CARBON	22	1/4W
R615	1-247-423-11	CARBON	3.3K	1/4W
R616	1-247-421-11	CARBON	2.2K	1/4W
R617	1-249-432-11	CARBON	18K	1/4W
R618	1-247-425-11	CARBON	4.7K	1/4W
R619	1-247-421-11	CARBON	2.2K	1/4W
R620	1-249-426-11	CARBON	5.6K	1/4W
R624	1-249-429-11	CARBON	10K	1/4W
R630	1-247-425-11	CARBON	4.7K	1/4W
R640	1-247-887-00	CARBON	220K	1/4W
R641	1-249-431-11	CARBON	15K	1/4W
		<VARIABLE RESISTOR>		
RV1	1-237-503-21	RES, VER, CARBON 10K		
RV601	1-237-445-11	RES, VER, CARBON 5.0K		
		<TRANSFORMER>		
T601	1-426-931-11	TRANSFORMER		
	1-655-575-11	D BOARD *******		
	*1-949-413-11	HARNESS HA-APS28-C		
		<CAPASITOR>		
C207	1-124-910-11	ELECT	47uF	50V
C210	1-124-122-11	ELECT	100uF	50V
C211	1-124-910-11	ELECT	47uF	50V
C214	1-136-165-00	FILM	0.1uF	50V
C215	1-130-475-00	FILM	2200PF	50V
C311	1-130-016-00	FILM	680PF	50V
C312	1-161-925-00	CERAMIC	100PF	500V
C313	1-136-165-00	FILM	0.1uF	50V
C314	1-124-910-11	ELECT	47uF	50V
C315	1-124-927-11	ELECT	4.7uF	50V
C316	1-130-481-00	FILM	6800PF	50V
C317	1-124-910-11	ELECT	47uF	50V
C322	1-162-117-00	CERAMIC	100PF	
C401	1-136-165-00	FILM	0.1uF	50V
C402	1-124-927-11	ELECT	4.7uF	50V
C403	1-124-927-11	ELECT	4.7uF	50V
C404	1-130-481-00	FILM	6800PF	50V
C405	1-124-910-11	ELECT	47uF	50V
C407	1-130-479-00	FILM	4700PF	50V
C411	1-162-117-00	CERAMIC	100PF	
		<CONNECTOR>		
CNP1	*1-770-420-11	CONNECTOR 9P		
CNP201	*1-770-419-11	CONNECTOR 6P		
		<DIODE>		
D203	8-719-982-20	DIODE HZS30NB2		
D205	8-719-911-19	DIODE 1SS119		
D206	8-719-010-38	DIODE HZS5.1NB2		
D304	8-719-930-85	DIODE HZS12NB3		
D404	8-719-110-13	DIODE HZS9.1NB2		

Ref.No	Part No.	Description		Remark
		<IC>		
IC201	8-759-991-16	IC BA10358		
IC203	8-759-321-95	IC HA17431PA		
IC301	8-759-332-12	IC HA16114P		
IC401	8-759-332-12	IC HA16114P		
		<TRANSISTOR>		
Q202	8-729-119-78	TRANSISTOR 2SC2785TP-J		
		<RESISTOR>		
R1	1-249-429-11	CARBON	10K	1/4W
R2	1-249-417-11	CARBON	1K	1/4W
R3	1-215-449-00	METAL OXIDE	15K	1/4W
R205	1-249-429-11	CARBON	10K	1/4W
R206	1-249-425-11	CARBON	4.7K	1/4W
R207	1-249-413-11	CARBON	470	1/4W
R208	1-249-413-11	CARBON	470	1/4W
R209	1-249-425-11	CARBON	4.7K	1/4W
R210	1-249-425-11	CARBON	4.7K	1/4W
R214	1-249-429-11	CARBON	10K	1/4W
R215	1-249-435-11	CARBON	33K	1/4W
R217	1-215-451-00	METAL OXIDE	18K	1/4W
R219	1-215-457-00	METAL OXIDE	33K	1/4W
R223	1-215-443-00	METAL OXIDE	8.2K	1/4W
R228	1-247-903-00	CARBON	1M	1/4W
R250	1-215-437-00	METAL OXIDE	4.7K	1/4W
R251	1-215-437-00	METAL OXIDE	4.7K	1/4W
R311	1-124-857-91	CARBON	12K	1/4W
R312	1-249-441-11	CARBON	100K	1/4W
R315	1-215-446-00	METAL OXIDE	11K	1/4W
R316	1-215-451-00	METAL OXIDE	18K	1/4W
R317	1-249-421-11	CARBON	2.2K	1/4W
R318	1-247-893-11	CARBON	390K	1/4W
R321	1-249-409-11	CARBON	220	1/4W
R401	1-215-446-00	METAL OXIDE	11K	1/4W
R402	1-215-451-00	METAL OXIDE	18K	1/4W
R403	1-249-421-11	CARBON	2.2K	1/4W
R404	1-247-893-11	CARBON	390K	1/4W
R407	1-249-409-11	CARBON	220	1/4W
R409	1-249-441-11	CARBON	100K	1/4W
	*1-655-667-11	I BOARD *******		
	1-533-217-31	FUSE HOLDER		
	1-533-217-31	FUSE HOLDER		
	1-580-375-11	3P INLET 250V 10A		
		<FUSE>		
F101	1-576-231-11	H.B.C FUSE 4A 250V		
F102	1-576-231-11	H.B.C FUSE 4A 250V		
	*1-655-573-12	M BOARD *******		
		<CAPASITOR>		
C101	1-107-973-11	FILM	0.22uF	250V
C104	1-107-973-11	FILM	0.22uF	250V
C105	1-161-742-00	CERAMIC	2200PF	400V
C108	1-161-973-00	CERAMIC	220PF	400V
C110	1-161-973-00	CERAMIC	220PF	400V
C113	1-110-652-11	FILM	0.015uF	700V
C115	1-136-153-00	FILM	0.01uF	
C116	1-136-153-00	FILM	0.01uF	

Ref.No	Part No.	Description		Remark
C118	1-130-471-00	FILM	1000PF	50V
C119	1-130-471-00	FILM	1000PF	50V
C122	1-161-742-00	CERAMIC	2200PF	400V
C126	1-124-122-11	ELECT	100uF	50V
C130	1-107-785-11	FILM	0.47MF	
C151	1-110-650-11	ELECT	180uF	450V
C152	1-107-787-11	FILM	0.22MF	
C153	1-107-785-11	FILM	0.47MF	
C154	1-107-785-11	FILM	0.47MF	
C193	1-136-153-00	FILM	0.01uF	
C201	1-110-608-11	ELECT	1500uF	35V
C202	1-110-608-11	ELECT	1500uF	35V
C203	1-164-477-91	CERAMIC	1000PF	500V
C205	1-126-104-11	ELECT	470uF	35V
C223	1-164-477-91	CERAMIC	1000PF	500V
C318	1-124-604-00	ELECT	330uF	10V
C321	1-124-472-11	ELECT	470uF	10V
C408	1-124-600-00	ELECT	270uF	25V
C410	1-124-480-11	ELECT	470uF	25V
		<CONNECTOR>		
CN101	*1-560-549-00	PIN (WITH V CONNECTOR BASE)		
CN202	*1-560-890-00	CONNECTOR PIN 2P		
		<DIODE>		
D101	8-719-510-22	DIODE D3SB60		
D102	8-719-200-92	DIODE 11EQS10		
D103	8-719-982-20	DIODE HZS30NB2		
D104	8-719-313-16	DIODE AU02A		
D105	8-719-313-16	DIODE AU02A		
D110	8-719-029-04	DIODE D5L60		
D201	8-719-050-57	DIODE F25P09QS		
D202	8-719-050-57	DIODE F25P09QS		
D301	8-719-052-37	DIODE F10P04Q		
D302	8-719-120-78	DIODE HZS6.2NB2		
D303	8-719-911-19	DIODE 1SS119		
D401	8-719-052-37	DIODE F10P04Q		
D402	8-719-110-49	DIODE HZS18NB2		
D403	8-719-911-19	DIODE 1SS119		
		<COIL>		
L1	1-424-482-11	COIL (SN8D-500)		
L2	1-424-482-11	COIL (SN8D-500)		
L101	1-411-186-11	COIL, CHOKE PQ-2625		
L301	1-411-185-11	COIL, CHOKE 50uH		
L302	1-424-255-11	COIL, CHOKE 10uH		
L401	1-411-185-11	COIL, CHOKE 50uH		
L402	1-424-255-11	COIL, CHOKE 10uH		
		<FILTER>		
LF102	1-423-740-11	LFT HR-28-E702		
LF103	1-421-622-11	TRANS, LINE FILTER S3-3082		
		<PHOTO INTERRUPTER>		
PH101	8-749-010-64	PHOTO COUPLER PC123FY2		
PH102	8-749-010-64	PHOTO COUPLER PC123FY2		
		<TRANSISTOR>		
Q101	8-729-024-28	TRANSISTOR 2SK2234		
Q102	8-729-024-28	TRANSISTOR 2SK2234		
Q103	8-729-024-28	TRANSISTOR 2SK2234		
Q302	8-729-322-37	TRANSISTOR 2SJ175		
Q401	8-729-322-37	TRANSISTOR 2SJ175		
		<RESISTOR>		
R101	1-260-134-11	CARBON	820K	1/2W
R107	1-249-417-11	CARBON	1K	1/4W
R109	1-247-901-11	CARBON	820K	1/4W
R110	1-247-901-11	CARBON	820K	1/4W
R111	1-215-902-11	METAL	47K	2W
R112	1-215-902-11	METAL	47K	2W
R113	1-247-863-91	CARBON	22K	1/4W
R114	1-247-863-91	CARBON	22K	1/4W
R115	1-216-361-00	METAL	0.22	2W
R116	1-216-361-00	METAL	0.22	2W
R117	1-247-901-11	CARBON	820K	1/4W
R118	1-249-399-11	CARBON	33	1/4W
R119	1-218-642-11	METAL	100K	1W
R120	1-218-642-11	METAL	100K	1W
R129	1-247-791-91	CARBON	22	1/4W
R131	1-218-191-11	METAL	0.1	1W
R132	1-247-901-11	CARBON	820K	1/4W
R133	1-247-901-11	CARBON	820K	1/4W
R134	1-247-901-11	CARBON	820K	1/4W
R140	1-219-213-11	FUSE	0.033	0.33W
R141	1-249-397-11	CARBON	22	1/4W
R236	1-215-861-00	METAL	47	1W
R280	1-249-425-11	CARBON	4.7K	1/4W
R320	1-218-191-11	METAL	0.1	1W
R322	1-215-445-00	METAL	10K	1/4W
R323	1-215-445-00	METAL	10K	1/4W
R330	1-247-887-00	CARBON	220K	1/4W
R331	1-247-887-00	CARBON	220K	1/4W
R350	1-218-191-11	METAL	0.1	1W
R406	1-218-191-11	METAL	0.1	1W
R410	1-215-445-00	METAL	10K	1/4W
R411	1-215-428-00	METAL	2K	1/4W
R450	1-218-191-11	METAL	0.1	1W
		<VARIABLE RESISTOR>		
RV201	1-237-445-11	RES, VER, CARBON	5.0K	
		<SWITCH>		
S101	1-554-880-11	PUSH SWITCH (AC POWER) (1 KEY)		
		<TRANSFORMER>		
T101	1-427-821-11	TRANSFORMER		
		<THERMISTOR>		
TH101	1-809-430-11	THERMISTOR 10D-11		
		<VARISTOR>		
V101	1-519-470-11	DISCHARGE		
VDR101	1-809-337-11	VARISTOR		
		<SWITCH>		
TS201	1-570-258-22	SWITCH, THERMAL REED		

****

The components identified by shading and mark ⚠ are critical for safety.
Replace only with part number specified.

Les composants identifies par une trame et une marque ⚠ sont critiques pour la securite.
Ne les remplacer que par une piece portant le numero specifie.

Ref.No	Part No.	Description	Remark
		<MISCELLANEOUS>	
	⚠*1-468-002-11	SWITCHING REGULATOR (SOPS-1088)	
	1-500-197-11	HEAD, THERMAL (LV5414)	
	1-554-512-00	SWITCH, MICRO	
	1-769-536-11	WIRE (FLAT TYPE) (26 CORE)	
	*1-949-468-11	HARNESS (B)	
	*1-949-471-11	HARNESS (E)	

****

Ref.No	Part No.	Description	Remark
		<ACCESSORY & PACKING MATERIALS>	
	1-551-475-31	CABLE ASSY	
	⚠1-551-631-22	CORD, POWER (UP-890CE)	
	⚠1-558-527-11	CORD, POWER (UP-890MD)	
	1-693-002-11	REMOTE COMMANDER (RM-91) (UP-890MD)	
	*3-173-904-02	CUSHION	
	*3-187-322-01	INDIVIDUAL CARTON (UP-890CE)	
	*3-187-324-01	INDIVIDUAL CARTON (UP-890MD)	
	3-798-008-11	MANUAL, INSTRUCTION (UP-890CE)	
	⚠3-798-008-11	MANUAL, INSTRUCTION (UP-890MD)	

****

Ref.No	Part No.	Description	Remark
		<HARDWARE LIST>	
	7-621-255-55	SCREW +P 2X8	
	7-627-556-08	SCREW +P 2.6X2.8	
	7-628-253-95	SCREW +PS 2.6X4	
	7-682-645-04	SCREW +PS 3X4	
	7-682-647-01	SCREW +PS 3X6	
	7-685-546-14	SCREW +BTP 3X8 TYPE2 N-S	
	7-685-546-19	SCREW +BTP 3X8 TYPE2 N-S	
	7-685-871-01	SCREW +BVTT 3X6 (S)	

****

MA board Part No. against the Serial No. for the set.

	Serial No.	Part No.
UP-890CE	16501 through 25100	1-655-122-21, 22
	25101 and Higher	1-655-122-23
UP-890MD	15801~29100	1-655-122-21, 22
	29101 and Higher	1-655-122-23

THIS NOTE IS COMMON FOR PRINTED WIRING BOARDS AND SCHEMATIC DIAGRAMS.
(In addition to this, the necessary note is printed in each block.)

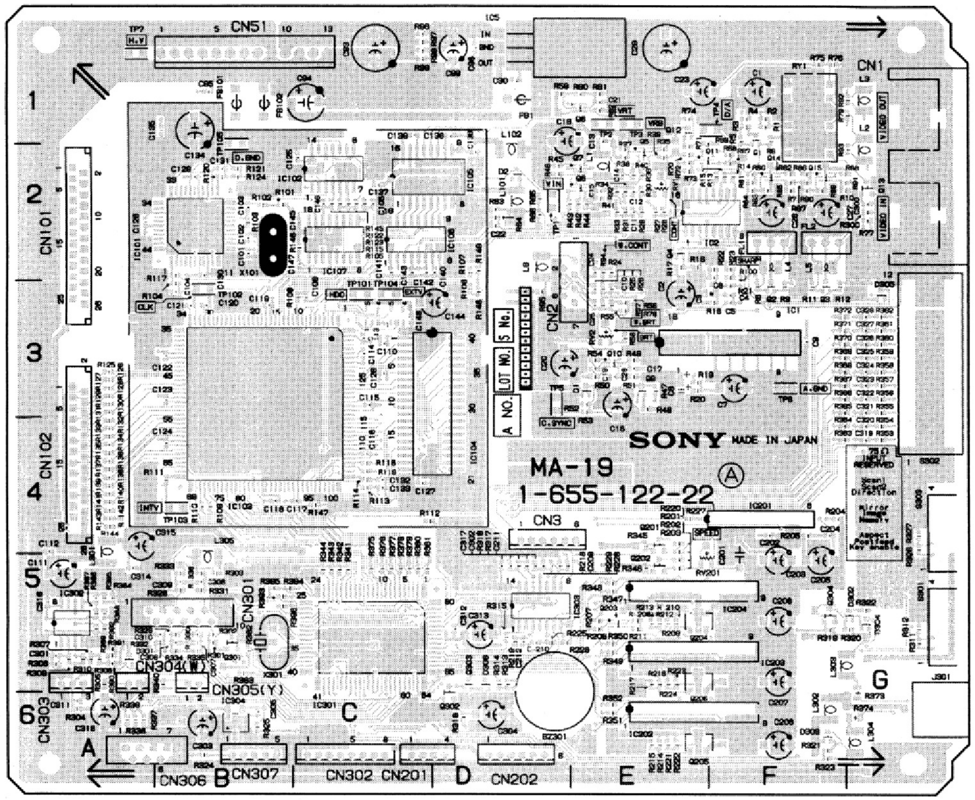
- **For Schematic Diagrams.**
- Caution when replacing chip parts.
  New parts must be attached after removal of chip.
  Be careful not to heat the minus side of tantalum capacitor, because it is damaged by the heat.
- All resistors are in ohms, 1/10W unless otherwise noted.
  kΩ: 1000Ω, MΩ: 1000kΩ.
- All capacitors are in μF unless otherwise noted.
  pF: μμF.
  50V or less are not indicated except for electrolytics and tantalums.
- NM: No Mount.

Note: The components identified by mark ⚠ are critical for safety. Replace only with part number specified.

Note: Les composants identifiés par une marque ⚠ sont d'une importance critique pour la sécurité. Ne les remplacer que par des pièces de numéro spécifié.

DIAGRAMS

MA-19 BOARD (-21, 22)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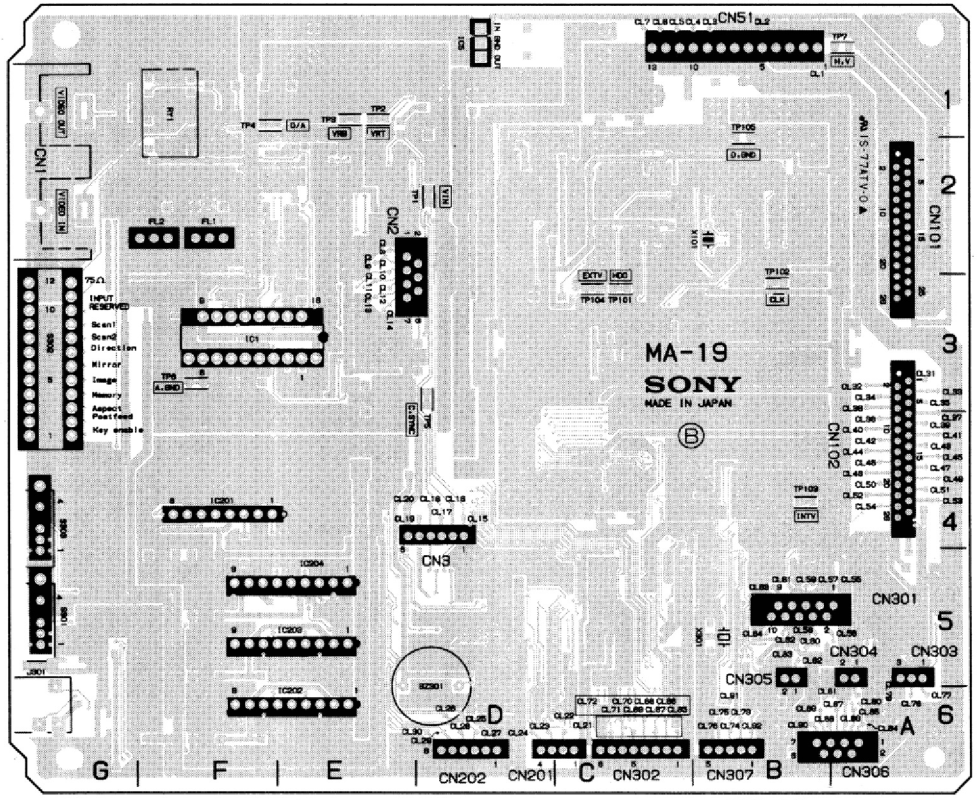
CN51
CN1
CN101
CN102
CN2
CN3
CN301
CN303
CN304(W)
CN305(Y)
CN306
CN307
CN302
CN201
CN202
IC1
IC5
IC201
IC202
IC203
IC204
IC301
BZ301
J301
VIDEO OUT
VIDEO IN
A NO.
LOT NO.
S No.
MA-19
1-655-122-22
Ⓐ
SONY MADE IN JAPAN

MA-19 -COMPONENT SIDE-
1-655-122-21, 22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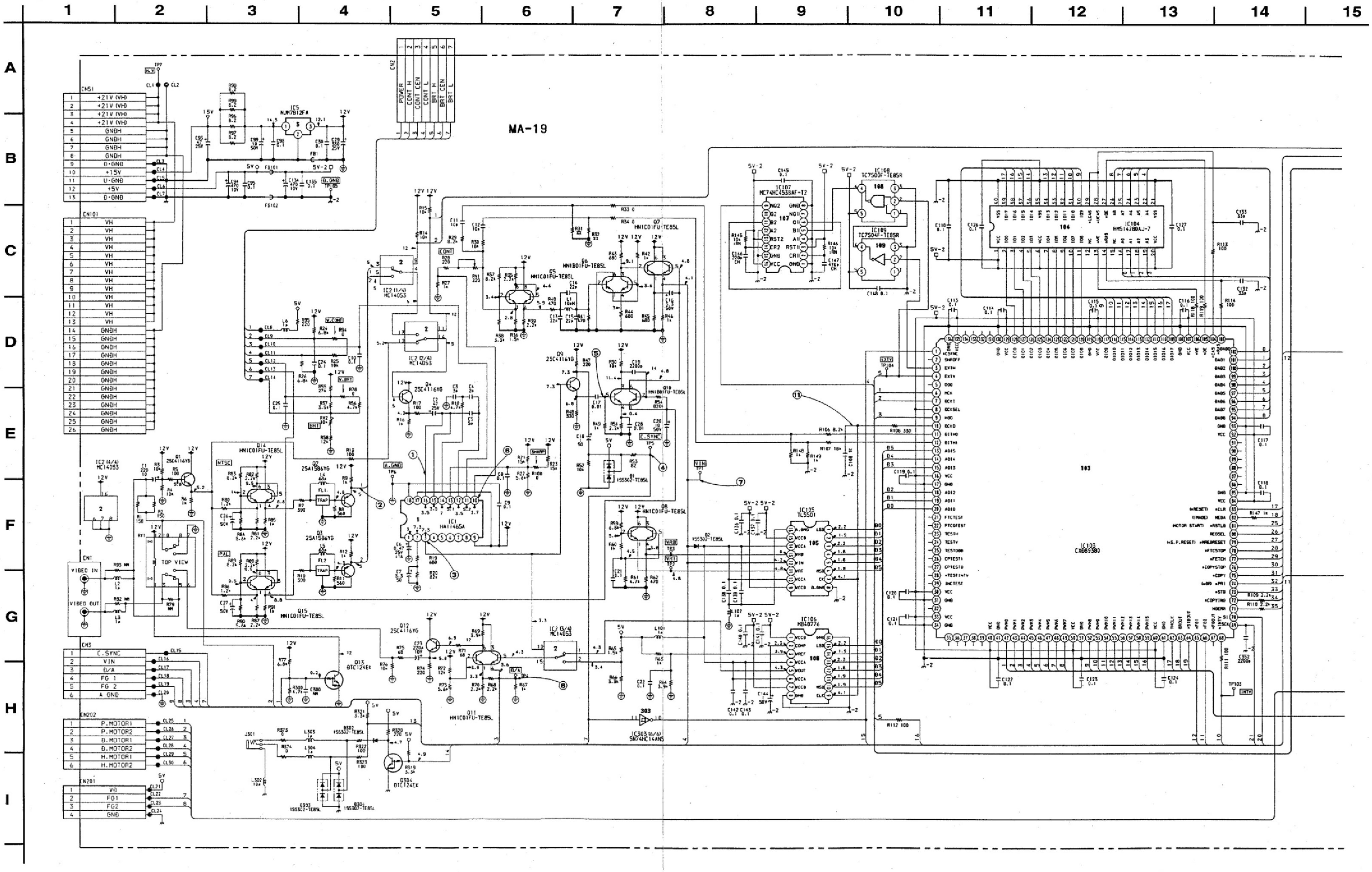
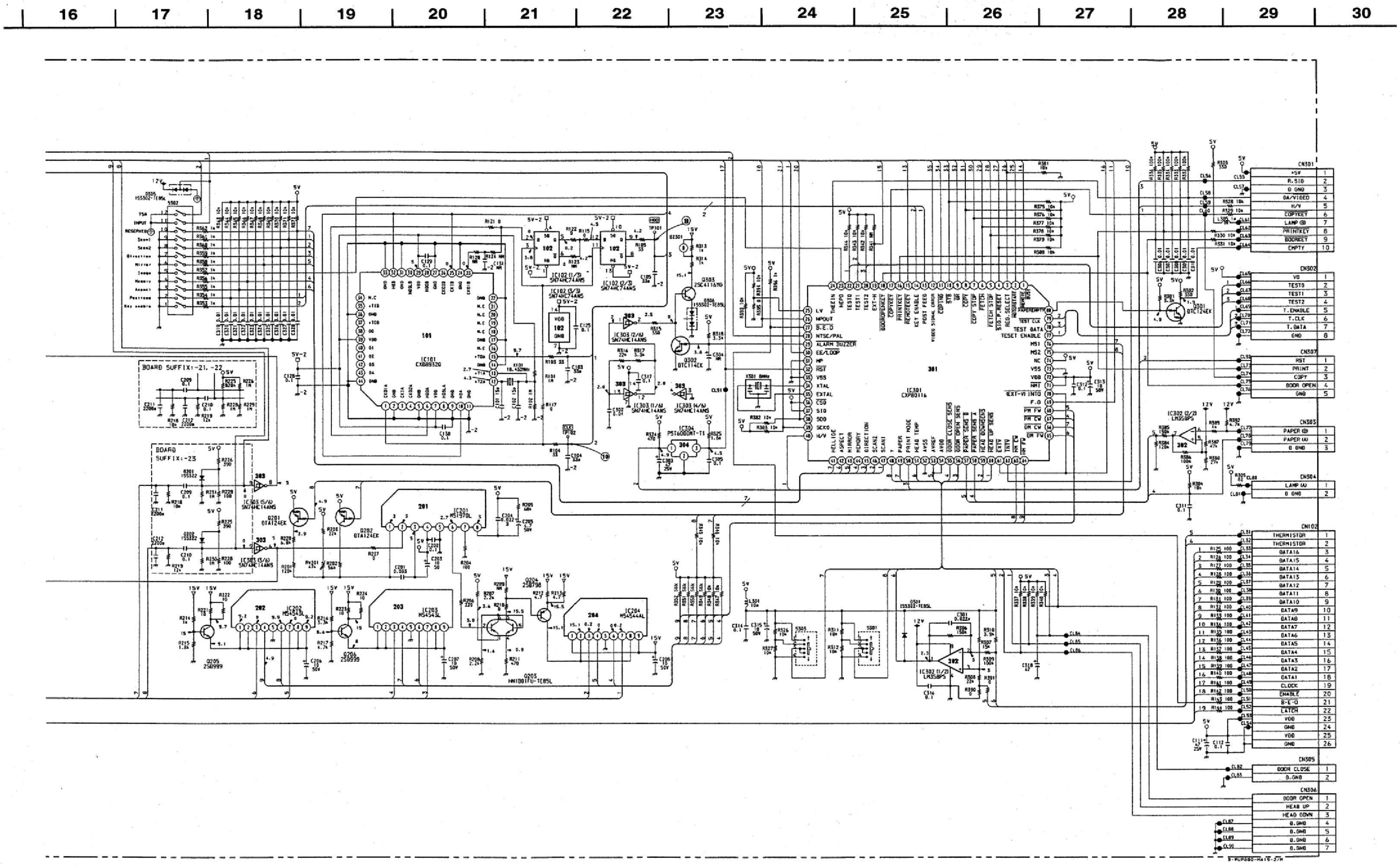
CN51
CN1
CN101
CN102
CN2
CN3
CN301
CN303
CN304
CN305
CN306
CN307
CN302
CN201
CN202
IC1
IC201
IC202
IC203
IC204
FL1
FL2
VIDEO OUT
VIDEO IN
INPUT RESERVED
Scan1
Scan2
Direction
Mirror
Image
Memory
Aspect Postfeed
Key enable
MA-19
SONY
MADE IN JAPAN
Ⓑ

MA-19 -SOLDERING SIDE-
1-655-122-21, 22

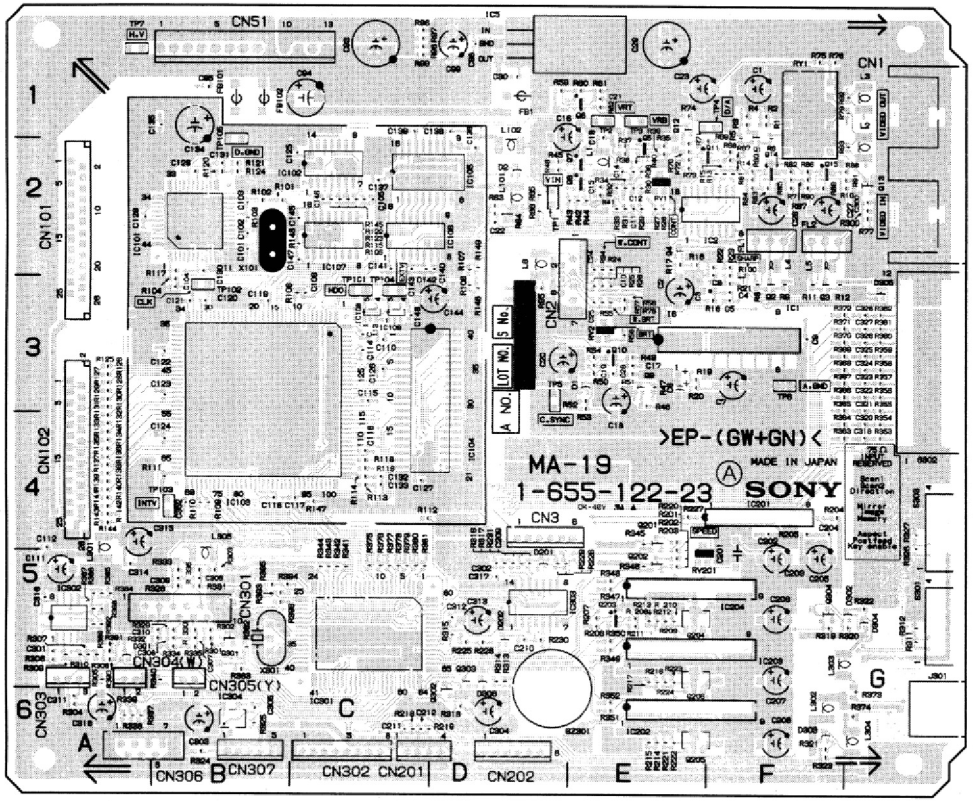
MA-19 BOARD (-21, 22)

BZ301	D-6	D302	G-5	IC108	C-3	L303	F-5	Q205	E-6
		D303	F-6	IC109	C-3	L304	G-6	Q206	E-5
CN1	G-1	D304	G-5	IC201	F-4	L305	B-5	Q301	B-5
CN2	D-3	D305	G-3	IC202	E-6			Q302	D-5
CN3	D-4	D306	D-5	IC203	E-5	Q1	F-1	Q303	D-5
CN51	B-1			IC204	E-5	Q2	E-1	Q304	F-5
CN101	A-2	FB1	D-1	IC301	C-5	Q3	F-3		
CN102	A-4	FB101	B-1	IC302	A-5	Q4	E-2	RV1	E-2
CN201	C-6	FB102	B-1	IC303	D-5	Q5	E-2	RV2	E-3
CN202	D-6			IC304	B-6	Q6	E-2	RV201	E-5
CN301	B-5	FL1	F-2			Q7	E-2		
CN302	C-6	FL2	F-2	J301	G-6	Q8	E-1	RY1	F-1
CN303	A-5					Q9	E-3		
CN304	A-5	IC1	F-3	L1	E-2	Q10	E-3	S301	G-5
CN305	B-5	IC2	E-2	L2	G-2	Q11	E-2	S302	G-4
CN306	B-6	IC5	D-1	L3	G-1	Q12	E-1	S303	G-4
CN307	B-6	IC101	B-2	L4	F-2	Q13	G-2		
		IC102	C-2	L5	F-2	Q14	F-2	X101	B-2
D1	E-3	IC103	B-4	L6	D-2	Q15	F-2	X301	B-5
D2	D-2	IC104	D-4	L101	D-2	Q201	E-4		
D201	D-5	IC105	C-2	L102	D-2	Q202	E-5		
D202	D-5	IC106	C-2	L301	A-5	Q203	E-5		
D301	A-5	IC107	C-2	L302	A-6	Q204	E-5		


MA-19
CN51
+21V (VH)
GNDH
D-GND
+15V
U-GND
+5V
CN101
VH
GNDH
CN2
POWER
CONT H
CONT CEN
CONT L
BAT H
BAT CEN
BAT L
IC5
NJM78L12FA
CN1
VIDEO IN
VIDEO OUT
TOP VIEW
CN3
C.SYNC
VIN
D/A
FG 1
FG 2
A GND
CN202
P.MOTOR1
P.MOTOR2
D.MOTOR1
D.MOTOR2
H.MOTOR1
H.MOTOR2
CN201
VD
FG1
FG2
GND
IC1
HA11465A
IC2 (1/4)
MC14053
IC2 (2/4)
MC14053
IC2 (3/4)
MC14053
IC2 (4/4)
MC14053
Q1
2SC4116YG
Q2
2SA1586YG
Q3
2SA1586YG
Q4
2SC4116YG
Q5
HN1C01FU-TE85L
Q6
HN1B01FU-TE85L
Q7
HN1C01FU-TE85L
Q8
HN1C01FU-TE85L
Q9
2SC4116YG
Q10
HN1B01FU-TE85L
Q11
HN1C01FU-TE85L
Q12
2SC4116YG
Q13
DTC124EK
Q14
HN1C01FU-TE85L
Q15
HN1C01FU-TE85L
D304
DTC124EK
NTSC
PAL
A.GND
SHARP
C.SYNC
VIN
VRB
VRT
EXTV
INTH
W.CONT
W.BAT
BRT
CONT
IC105
TL5501
IC106
MB40776
IC107
MC74HC4538AF-T2
IC108
TC7S00F-TE85R
IC109
TC7S04F-TE85R
IC104
HM514280AJ-7
IC103
CXD8958D
IC303 (6/6)
SN74HC14ANS
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
A B C D E F G H I


16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
BOARD SUFFIX:-21,-22
BOARD SUFFIX:-23
IC101 CXD8932Q
101
IC102 (1/3) SN74HC74ANS
IC102 (2/3) SN74HC74ANS
IC102 (3/3) SN74HC74ANS
X101 18.432MHz
IC201 M51970L
IC202 M54543L
IC203 M54543L
IC204 M54544AL
Q201 DTA124EK
Q202 DTA124EK
Q203 HN1B01FU-TE85L
Q204 2SB798
Q205 2SD999
Q206 2SD999
IC301 CXP80116
X301 8MHz
IC302 (1/2) LM358PS
IC302 (2/2) LM358PS
IC303 (1/6) SN74HC14ANS
IC303 (2/6) SN74HC14ANS
IC303 (4/6) SN74HC14ANS
IC303 (5/6) SN74HC14ANS
IC304 PST600DMT-T1
Q301 DTC124EK
Q302 DTC114EK
Q303 2SC4116YG
D301 1SS302-TE85L
D304 1SS302-TE85L
D305 1SS302-TE85L
S302
TSA
INPUT
RESERVED
Scan1
Scan2
Direction
Mirror
Image
Memory
Aspect
Position
Key enable
LV
HPOUT
B.E.O
NTSC/PAL
ALARM BUZZER
EE/LOOP
HP
RST
VSS
XTAL
EXTAL
CS0
SIO
SOO
SCKO
H/V
HELLIDE
ASPECT
MIRROR
MEMORY
DIRECTION
SCAN2
SCAN1
PAPER
PRINT MODE
HEAD TEMP
AVSS
AVREF
AVDD
DOOR CLOSE SENS
DOOR OPEN SENS
PAPER SENS B
PAPER SENS A
HEAD DOWNSENS
HEAD UP SENS
EXTV
INTV
HM CW
HM FW
DM FW
DM CW
NMI
VDD
VSS
NC
MS2
MS1
TESET ENABLE
TEST DATA
TEST CLK
PAPEREMPTY
REMOTE BUSY
REG.SELECT
SIG.P.RESET
FETCH STOP
FETCH
COPY STOP
COPY
STB
DR
COPYING
VIDEO SIGNAL ERROR
POST FEED
KEY ENABLE
REMOTEKEY
PRINTKEY
COPYKEY
DOOROPENKEY
EXT-H
TEST2
TEST1
TEST0
HEPO
THEEIN
CN301
+5V
R.SIG
D GND
DA/VIDEO
H/V
COPYKEY
LAMP (B)
PRINTKEY
DOORKEY
EMPTY
CN302
VD
TEST0
TEST1
TEST2
T.ENABLE
T.CLK
T.DATA
GND
CN307
RST
PRINT
COPY
DOOR OPEN
GND
CN303
PAPER (B)
PAPER (A)
D GND
CN304
LAMP (A)
D GND
CN102
THERMISTOR
THERMISTOR
DATA16
DATA15
DATA14
DATA13
DATA12
DATA11
DATA10
DATA9
DATA8
DATA7
DATA6
DATA5
DATA4
DATA3
DATA2
DATA1
CLOCK
ENABLE
B·E·O
LATCH
VDD
GND
VDD
GND
CN305
DOOR CLOSE
D.GND
CN306
DOOR OPEN
HEAD UP
HEAD DOWN
D.GND
D.GND
D.GND
D.GND
B-PUP880-MA19-2/M

MA-19 BOARD (-23)


CN51
CN1
CN101
CN102
CN2
CN3
CN301
CN302
CN201
CN202
CN303
CN304(W)
CN305(Y)
CN306
CN307
VIDEO OUT
VIDEO IN
A NO.
LOT NO.
S No.
MA-19
1-655-122-23
Ⓐ
SONY
MADE IN JAPAN
>EP-(GW+GN)<
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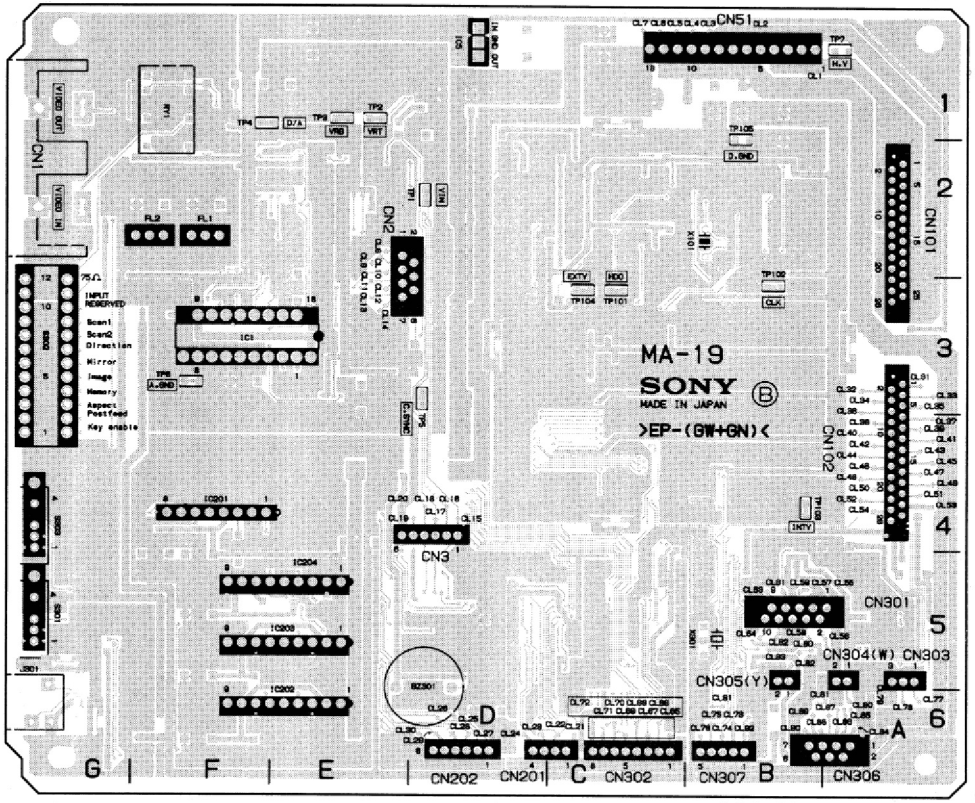
MA-19 -COMPONENT SIDE-
1-655-122-23


CN51
CN1
CN101
CN102
CN2
CN3
CN301
CN302
CN201
CN202
CN303
CN304(W)
CN305(Y)
CN306
CN307
VIDEO OUT
VIDEO IN
MA-19
SONY
Ⓑ
MADE IN JAPAN
>EP-(GW+GN)<
INPUT RESERVED
Scan1
Scan2
Direction
Mirror
Image
Memory
Aspect
Postfeed
Key enable
1
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3
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A
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C
D
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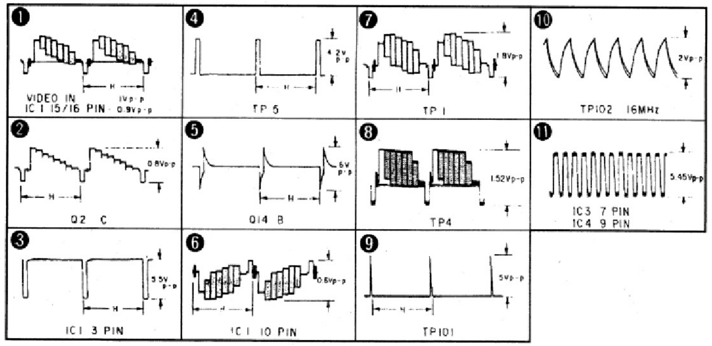
G

MA-19 -SOLDERING SIDE-
1-655-122-23



MA-19 BOARD (-23)

BZ301	D-6
CN1	G-1
CN2	D-3
CN3	D-4
CN51	B-1
CN101	A-2
CN102	A-4
CN201	C-6
CN202	D-6
CN301	B-5
CN302	C-6
CN303	A-5
CN304	A-5
CN305	B-5
CN306	B-6
CN307	B-6
D1	E-3
D2	D-2
D201	D-5
D202	D-5
D301	A-5
D302	G-5
D303	F-6
D304	G-5
D305	G-3
D306	D-5
FB1	D-1
FB101	B-1
FB102	B-1
FL1	F-2
FL2	F-2
IC1	F-3
IC2	E-2
IC5	D-1
IC101	B-2
IC102	C-2
IC103	B-4
IC104	D-4
IC105	C-2
IC106	C-2
IC107	C-2
IC108	C-3
IC109	C-3
IC201	F-4
IC202	E-6
IC203	E-5
IC204	E-5
IC301	C-5
IC302	A-5
IC303	D-5
IC304	B-6
J301	G-6
L1	E-2
L2	G-2
L3	G-1
L4	F-2
L5	F-2
L6	D-2
L101	D-2
L102	D-2
L301	A-5
L302	A-6
L303	F-5
L304	G-6
L305	B-5
Q1	F-1
Q2	E-1
Q3	F-3
Q4	E-2
Q5	E-2
Q6	E-2
Q7	E-2
Q8	E-1
Q9	E-3
Q10	E-3
Q11	E-2
Q12	E-1
Q13	G-2
Q14	F-2
Q15	F-2
Q201	E-4
Q202	E-5
Q203	E-5
Q204	E-5
Q205	E-6
Q206	E-5
Q301	B-5
Q302	D-5
Q303	D-5
Q304	F-5
RV1	E-2
RV2	E-3
RV201	E-5
RY1	F-1
S301	G-5
S302	G-4
S303	G-4
X101	B-2
X301	B-5

SECTION 7
ELECTRICAL PARTS LIST

7-1. Parts Information

- Safety Related Components Warning
  components identified by ⚠ marking on the schematic diagrams and repair parts list are critical to safe operation. Replace these components with Sony parts whose part numbers appear in this manual or in service bulletins and service manual supplements published by Sony.

- Replacement Parts supplied from Sony Parts center will sometimes have a different shape from the original parts.
  This is due to "accommodating the improved parts and/or engineering changes" or "standardization of genuine parts" . This manual's repair parts list indicates the parts numbers of "the standardized genuine parts at present" .
  Regarding engineering parts changes in our engineering department refer to Sony service bullentins and service manual supplements.

- Items marked "o" in the SP column of the parts list are not stocked since they are seldom required for routine service.
  Some delay should be anticipated when ordering these items.

- Abbreviations

Ref. No.	Description
C□□, CV□□	CAPACITOR
R□□, RV□□	RESISTOR

- Units for Capacitors, Inductors and Resistors.
  The following units are assumed in schematic diagrams and repair parts list unless otherwise specified.

Capacitors	: μF or pF
Inductors	: μH
Resistors	: Ω

MA-19 BOARD

Ref. No. or Q'ty	Part No.	Description
1pc	*A-8265-924-B	MOUNTED CIRCUIT BOARD, MA-19
BZ301	1-529-080-11	BUZZER, PIEZOELECTRIC
C1	1-126-923-11	ELECT 220uF 20% 10V
C2	1-104-664-11	ELECT 47uF 20% 25V
C3	1-163-220-11	CERAMIC 3PF 0.25PF 50V
C4	1-162-907-11	CERAMIC, CHIP 2PF 50V
C5	1-162-910-11	CERAMIC 5PF 0.25PF 50V
C6	1-135-145-11	TANTALUM, CHIP 0.47uF 10% 35V
C7	1-126-962-11	ELECT 3.3uF 20% 50V
C8	1-164-156-11	CERAMIC 0.1uF 25V
C9	1-164-156-11	CERAMIC 0.1uF 25V
C10	1-164-156-11	CERAMIC 0.1uF 25V
C11	1-162-915-11	CERAMIC, CHIP 10PF 0.5PF 50V
C12	1-162-915-11	CERAMIC, CHIP 10PF 0.5PF 50V
C13	1-162-919-11	CERAMIC, CHIP 22PF 5% 50V
C14	1-162-919-11	CERAMIC, CHIP 22PF 5% 50V
C15	1-162-919-11	CERAMIC, CHIP 22PF 5% 50V
C16	1-126-962-11	ELECT 3.3uF 20% 50V
C17	1-162-974-11	CERAMIC 0.01uF 50V
C18	1-124-903-11	ELECT 1uF 20% 50V
C19	1-162-966-11	CERAMIC, CHIP 0.0022uF 10% 50V
C20	1-126-964-11	ELECT 10uF 20% 50V
C21	1-164-156-11	CERAMIC 0.1uF 25V
C22	1-164-156-11	CERAMIC 0.1uF 25V
C23	1-126-923-11	ELECT 220uF 20% 10V
C24	1-164-156-11	CERAMIC 0.1uF 25V
C25	1-164-156-11	CERAMIC 0.1uF 25V
C26	1-124-903-11	ELECT 1uF 20% 50V
C27	1-124-903-11	ELECT 1uF 20% 50V
C28	1-162-974-11	CERAMIC 0.01uF 50V
C29	1-126-940-11	ELECT 330uF 20% 25V
C30	1-164-156-11	CERAMIC 0.1uF 25V
C93	1-104-664-11	ELECT 47uF 20% 25V
C94	1-126-925-11	ELECT 470uF 20% 10V
C95	1-164-156-11	CERAMIC 0.1uF 25V
C98	1-164-156-11	CERAMIC 0.1uF 25V
C99	1-126-964-11	ELECT 10uF 20% 50V
C101	1-162-917-11	CERAMIC, CHIP 15PF 5% 50V
C102	1-162-917-11	CERAMIC, CHIP 15PF 5% 50V
C103	1-162-921-11	CERAMIC, CHIP 33PF 5% 50V
C104	1-162-921-11	CERAMIC, CHIP 33PF 5% 50V
C105	1-162-921-11	CERAMIC, CHIP 33PF 5% 50V
C108	1-216-821-11	METAL, CHIP 1K 5% 1/16W
C110	1-164-156-11	CERAMIC 0.1uF 25V
C111	1-104-664-11	ELECT 47uF 20% 25V
C112	1-164-156-11	CERAMIC 0.1uF 25V
C113	1-164-156-11	CERAMIC 0.1uF 25V
C114	1-164-156-11	CERAMIC 0.1uF 25V
C115	1-164-156-11	CERAMIC 0.1uF 25V
C116	1-164-156-11	CERAMIC 0.1uF 25V
C117	1-164-156-11	CERAMIC 0.1uF 25V
C118	1-164-156-11	CERAMIC 0.1uF 25V
C119	1-164-156-11	CERAMIC 0.1uF 25V
C120	1-164-156-11	CERAMIC 0.1uF 25V
C121	1-164-156-11	CERAMIC 0.1uF 25V
C122	1-164-156-11	CERAMIC 0.1uF 25V
C123	1-164-156-11	CERAMIC 0.1uF 25V
C124	1-164-156-11	CERAMIC 0.1uF 25V
C125	1-164-156-11	CERAMIC 0.1uF 25V
C126	1-164-156-11	CERAMIC 0.1uF 25V
C127	1-164-156-11	CERAMIC 0.1uF 25V
C128	1-164-156-11	CERAMIC 0.1uF 25V
C129	1-164-156-11	CERAMIC 0.1uF 25V
C130	1-164-156-11	CERAMIC 0.1uF 25V
C132	1-162-921-11	CERAMIC, CHIP 33PF 5% 50V
C133	1-162-921-11	CERAMIC, CHIP 33PF 5% 50V
C134	1-126-925-11	ELECT 470uF 20% 10V
C135	1-164-156-11	CERAMIC 0.1uF 25V
C136	1-164-156-11	CERAMIC 0.1uF 25V
C137	1-164-156-11	CERAMIC 0.1uF 25V
C138	1-164-156-11	CERAMIC 0.1uF 25V
C139	1-164-156-11	CERAMIC 0.1uF 25V
C140	1-164-156-11	CERAMIC 0.1uF 25V
C141	1-164-156-11	CERAMIC 0.1uF 25V
C142	1-164-156-11	CERAMIC 0.1uF 25V
C143	1-164-156-11	CERAMIC 0.1uF 25V
C144	1-124-903-11	ELECT 1uF 20% 50V
C145	1-164-156-11	CERAMIC 0.1uF 25V
C146	1-162-957-11	CERAMIC 220PF 5% 50V
C147	1-164-315-11	CERAMIC 470PF 5% 50V
C148	1-164-156-11	CERAMIC 0.1uF 25V
C201	1-130-489-00	MYLAR 0.033uF 5% 50V
C202	1-164-156-11	CERAMIC 0.1uF 25V
C203	1-126-964-11	ELECT 10uF 20% 50V
C204	1-164-227-11	CERAMIC 0.022uF 10% 25V
C205	1-126-963-11	ELECT 4.7uF 20% 50V
C206	1-126-964-11	ELECT 10uF 20% 50V
C207	1-126-964-11	ELECT 10uF 20% 50V
C208	1-126-964-11	ELECT 10uF 20% 50V
C209	1-164-156-11	CERAMIC 0.1uF 25V
C210	1-164-156-11	CERAMIC 0.1uF 25V
C211	1-162-966-11	CERAMIC, CHIP 0.0022uF 10% 50V
C212	1-162-966-11	CERAMIC, CHIP 0.0022uF 10% 50V
C301	1-164-227-11	CERAMIC 0.022uF 10% 25V
C302	1-162-970-11	CERAMIC, CHIP 0.01uF 10% 25V
C303	1-104-664-11	ELECT 47uF 20% 25V
C305	1-164-156-11	CERAMIC 0.1uF 25V
C306	1-162-974-11	CERAMIC 0.01uF 50V
C307	1-162-974-11	CERAMIC 0.01uF 50V
C308	1-162-974-11	CERAMIC 0.01uF 50V
C309	1-162-974-11	CERAMIC 0.01uF 50V
C310	1-162-974-11	CERAMIC 0.01uF 50V
C311	1-164-156-11	CERAMIC 0.1uF 25V
C312	1-164-156-11	CERAMIC 0.1uF 25V
C313	1-126-964-11	ELECT 10uF 20% 50V
C314	1-164-156-11	CERAMIC 0.1uF 25V
C315	1-126-964-11	ELECT 10uF 20% 50V
C316	1-164-156-11	CERAMIC 0.1uF 25V
C317	1-164-156-11	CERAMIC 0.1uF 25V
C318	1-104-664-11	ELECT 47uF 20% 25V
C319	1-162-974-11	CERAMIC 0.01uF 50V

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Ref. No. or Q'ty	Part No.	Description
C320	1-162-974-11	CERAMIC 0.01uF 50V
C321	1-162-974-11	CERAMIC 0.01uF 50V
C322	1-162-974-11	CERAMIC 0.01uF 50V
C323	1-162-974-11	CERAMIC 0.01uF 50V
C324	1-162-974-11	CERAMIC 0.01uF 50V
C325	1-162-974-11	CERAMIC 0.01uF 50V
C326	1-162-974-11	CERAMIC 0.01uF 50V
C327	1-162-974-11	CERAMIC 0.01uF 50V
C328	1-162-974-11	CERAMIC 0.01uF 50V
C352	1-162-966-11	CERAMIC, CHIP 0.0022uF 10% 50V
CN1	1-691-431-11	CONNECTOR ASSY, BNC
CN2	1-569-536-11	SOCKET, CONNECTOR 7P
CN3	*1-564-005-11	CONNECTOR 6P, MALE
CN101	*1-764-781-11	SOCKET, CONNECTOR 26P
CN102	*1-764-781-11	SOCKET, CONNECTOR 26P
CN201	1-506-469-11	CONNECTOR, 4P, MALE
CN202	1-506-471-11	CONNECTOR, 6P, MALE
CN301	1-562-719-11	SOCKET, CONNECTOR 10P
CN302	1-506-473-11	CONNECTOR, 8P, MALE
CN303	*1-506-468-11	CONNECTOR, 3P, MALE
CN304	1-506-467-11	CONNECTOR, 2P, MALE
CN305	1-506-467-11	CONNECTOR, 2P, MALE
CN306	1-569-536-11	SOCKET, CONNECTOR 7P
CN307	*1-564-004-11	PIN, CONNECTOR 5P
D1	8-719-820-41	DIODE 1SS302
D2	8-719-820-41	DIODE 1SS302
D201	8-719-031-17	DIODE 1SS322-TE85L
D202	8-719-031-17	DIODE 1SS322-TE85L
D301	8-719-820-41	DIODE 1SS302
D302	8-719-820-41	DIODE 1SS302
D303	8-719-820-41	DIODE 1SS302
D304	8-719-820-41	DIODE 1SS302
D305	8-719-820-41	DIODE 1SS302
D306	8-719-820-41	DIODE 1SS302
FB1	1-410-397-21	FERRITE BEAD INDUCTOR 1.1uH
FB101	1-410-397-21	FERRITE BEAD INDUCTOR 1.1uH
FB102	1-410-397-21	FERRITE BEAD INDUCTOR 1.1uH
FL1	1-760-578-11	TRAP, CERAMIC
FL2	1-579-348-11	TRAP, CERAMIC
IC1	8-759-304-10	IC HA11465A
IC2	8-759-300-71	IC MC14053BF
IC5	8-759-231-58	IC TA7812S
IC101	8-759-287-50	IC CXD8932Q
IC102	8-759-925-90	IC SN74HC74ANS
IC103	8-759-292-87	IC CXD8938Q
IC104	8-759-292-88	IC HM514280AJ-7
IC105	8-759-051-50	IC TL5501CDWA
IC106	8-759-051-51	IC MB40776PF
IC107	8-759-008-45	IC MC74HC4538F
IC108	8-759-231-32	IC TC7S00F
IC109	8-759-031-84	IC SC7S04F
IC201	8-759-051-52	IC M51970L
IC202	8-759-600-24	IC M54543L
IC203	8-759-600-24	IC M54543L
IC204	8-759-633-10	IC M54544AL
IC301	8-752-862-49	IC CXP80P116Q-2-279
IC302	8-759-983-69	IC LM358PS
IC303	8-759-925-80	IC SN74HC14ANS

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Ref. No. or Q'ty	Part No.	Description
IC304	8-759-278-46	IC PST600DMT-T1
J301	1-507-967-11	JACK
L1	1-408-777-00	INDUCTOR CHIP 10uH
L2	1-408-765-21	INDUCTOR CHIP 1uH
L3	1-408-765-21	INDUCTOR CHIP 1uH
L4	1-410-391-11	INDUCTOR CHIP 68uH
L5	1-410-391-11	INDUCTOR CHIP 68uH
L6	1-408-765-21	INDUCTOR CHIP 1uH
L101	1-408-765-21	INDUCTOR CHIP 1uH
L102	1-408-765-21	INDUCTOR CHIP 1uH
L301	1-408-777-00	INDUCTOR CHIP 10uH
L302	1-408-777-00	INDUCTOR CHIP 10uH
L303	1-408-765-21	INDUCTOR CHIP 1uH
L304	1-408-765-21	INDUCTOR CHIP 1uH
L305	1-408-765-21	INDUCTOR CHIP 1uH
Q1	8-729-230-63	TRANSISTOR 2SC4116YG
Q2	8-729-230-60	TRANSISTOR 2SA1586YG
Q3	8-729-230-60	TRANSISTOR 2SA1586YG
Q4	8-729-230-63	TRANSISTOR 2SC4116YG
Q5	8-729-427-72	TRANSISTOR HN1C01FU-TE85L
Q6	8-729-427-74	TRANSISTOR XP4601
Q7	8-729-427-72	TRANSISTOR HN1C01FU-TE85L
Q8	8-729-427-72	TRANSISTOR HN1C01FU-TE85L
Q9	8-729-230-63	TRANSISTOR 2SC4116YG
Q10	8-729-427-74	TRANSISTOR XP4601
Q11	8-729-427-72	TRANSISTOR HN1C01FU-TE85L
Q12	8-729-230-63	TRANSISTOR 2SC4116YG
Q13	8-729-901-00	TRANSISTOR DTC124EK
Q14	8-729-427-72	TRANSISTOR HN1C01FU-TE85L
Q15	8-729-427-72	TRANSISTOR HN1C01FU-TE85L
Q201	8-729-901-05	TRANSISTOR DTA124EK
Q202	8-729-901-05	TRANSISTOR DTA124EK
Q203	8-729-427-74	TRANSISTOR XP4601
Q204	8-729-101-07	TRANSISTOR 2SB798
Q205	8-729-140-75	TRANSISTOR 2SD999-CLCK
Q206	8-729-140-75	TRANSISTOR 2SD999-CLCK
Q301	8-729-901-00	TRANSISTOR DTC124EK
Q302	8-729-027-46	TRANSISTOR DTC114YKA-T146
Q303	8-729-230-63	TRANSISTOR 2SC4116YG
Q304	8-729-901-00	TRANSISTOR DTC124EK
R1	1-216-811-11	METAL, CHIP 150 5% 1/16W
R2	1-216-811-11	METAL, CHIP 150 5% 1/16W
R3	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R4	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R5	1-216-809-11	METAL, CHIP 100 5% 1/16W
R6	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R7	1-216-816-11	METAL, CHIP 390 5% 1/16W
R8	1-216-818-11	METAL, CHIP 560 5% 1/16W
R9	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R10	1-216-816-11	METAL, CHIP 390 5% 1/16W
R11	1-216-818-11	METAL, CHIP 560 5% 1/16W
R12	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R13	1-216-809-11	METAL, CHIP 100 5% 1/16W
R14	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R15	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R16	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R17	1-216-809-11	METAL, CHIP 100 5% 1/16W

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Ref. No. or Q'ty	Part No.	Description
R18	1-216-829-11	METAL, CHIP 4.7K 5% 1/16W
R19	1-216-819-11	METAL, CHIP 680 5% 1/16W
R20	1-216-844-11	METAL, CHIP 82K 5% 1/16W
R21	1-216-835-11	METAL, CHIP 15K 5% 1/16W
R22	1-216-830-11	METAL, CHIP 5.6K 5% 1/16W
R23	1-216-835-11	METAL, CHIP 15K 5% 1/16W
R24	1-216-831-11	METAL, CHIP 6.8K 5% 1/16W
R25	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R26	1-216-831-11	METAL, CHIP 6.8K 5% 1/16W
R27	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R28	1-216-813-11	METAL, CHIP 220 5% 1/16W
R29	1-216-832-11	METAL, CHIP 8.2K 5% 1/16W
R30	1-216-836-11	METAL, CHIP 18K 5% 1/16W
R33	1-216-864-11	METAL, CHIP 0 5% 1/16W
R34	1-216-864-11	METAL, CHIP 0 5% 1/16W
R35	1-216-825-11	METAL, CHIP 2.2K 5% 1/16W
R36	1-216-823-11	METAL, CHIP 1.5K 5% 1/16W
R37	1-216-832-11	METAL, CHIP 8.2K 5% 1/16W
R38	1-216-827-11	METAL, CHIP 3.3K 5% 1/16W
R39	1-216-825-11	METAL, CHIP 2.2K 5% 1/16W
R40	1-216-817-11	METAL, CHIP 470 5% 1/16W
R41	1-216-817-11	METAL, CHIP 470 5% 1/16W
R42	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R43	1-216-819-11	METAL, CHIP 680 5% 1/16W
R44	1-216-819-11	METAL, CHIP 680 5% 1/16W
R45	1-216-819-11	METAL, CHIP 680 5% 1/16W
R46	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R47	1-216-813-11	METAL, CHIP 220 5% 1/16W
R48	1-216-815-11	METAL, CHIP 330 5% 1/16W
R49	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R50	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R51	1-216-825-11	METAL, CHIP 2.2K 5% 1/16W
R52	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R53	1-216-808-11	METAL, CHIP 82 5% 1/16W
R54	1-216-856-11	METAL, CHIP 820K 5% 1/16W
R55	1-216-838-11	METAL, CHIP 27K 5% 1/16W
R56	1-216-829-11	METAL, CHIP 4.7K 5% 1/16W
R57	1-216-828-11	METAL, CHIP 3.9K 5% 1/16W
R58	1-216-834-11	METAL, CHIP 12K 5% 1/16W
R59	1-216-831-11	METAL, CHIP 6.8K 5% 1/16W
R60	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R61	1-216-829-11	METAL, CHIP 4.7K 5% 1/16W
R62	1-216-817-11	METAL, CHIP 470 5% 1/16W
R63	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R64	1-216-828-11	METAL, CHIP 3.9K 5% 1/16W
R65	1-216-823-11	METAL, CHIP 1.5K 5% 1/16W
R66	1-216-827-11	METAL, CHIP 3.3K 5% 1/16W
R67	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R68	1-216-825-11	METAL, CHIP 2.2K 5% 1/16W
R69	1-216-828-11	METAL, CHIP 3.9K 5% 1/16W
R70	1-216-825-11	METAL, CHIP 2.2K 5% 1/16W
R71	1-216-807-11	METAL, CHIP 68 5% 1/16W
R72	1-216-834-11	METAL, CHIP 12K 5% 1/16W
R73	1-216-830-11	METAL, CHIP 5.6K 5% 1/16W
R74	1-216-813-11	METAL, CHIP 220 5% 1/16W
R75	1-216-807-11	METAL, CHIP 68 5% 1/16W
R76	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R77	1-216-831-11	METAL, CHIP 6.8K 5% 1/16W
R78	1-216-864-11	METAL, CHIP 0 5% 1/16W

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Ref. No. or Q'ty	Part No.	Description
R80	1-216-822-11	METAL, CHIP 1.2K 5% 1/16W
R81	1-216-825-11	METAL, CHIP 2.2K 5% 1/16W
R82	1-216-825-11	METAL, CHIP 2.2K 5% 1/16W
R83	1-216-832-11	METAL, CHIP 8.2K 5% 1/16W
R84	1-216-830-11	METAL, CHIP 5.6K 5% 1/16W
R85	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R86	1-216-822-11	METAL, CHIP 1.2K 5% 1/16W
R87	1-216-825-11	METAL, CHIP 2.2K 5% 1/16W
R88	1-216-825-11	METAL, CHIP 2.2K 5% 1/16W
R89	1-216-832-11	METAL, CHIP 8.2K 5% 1/16W
R90	1-216-830-11	METAL, CHIP 5.6K 5% 1/16W
R91	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R94	1-216-864-11	METAL, CHIP 0 5% 1/16W
R95	1-216-813-11	METAL, CHIP 220 5% 1/16W
R96	1-216-796-11	METAL, CHIP 8.2 5% 1/16W
R97	1-216-796-11	METAL, CHIP 8.2 5% 1/16W
R98	1-216-796-11	METAL, CHIP 8.2 5% 1/16W
R99	1-216-796-11	METAL, CHIP 8.2 5% 1/16W
R100	1-216-864-11	METAL, CHIP 0 5% 1/16W
R101	1-216-857-11	METAL, CHIP 1M 5% 1/16W
R102	1-216-857-11	METAL, CHIP 1M 5% 1/16W
R103	1-216-803-11	METAL, CHIP 33 5% 1/16W
R104	1-216-803-11	METAL, CHIP 33 5% 1/16W
R105	1-216-803-11	METAL, CHIP 33 5% 1/16W
R106	1-216-832-11	METAL, CHIP 8.2K 5% 1/16W
R107	1-216-836-11	METAL, CHIP 18K 5% 1/16W
R108	1-216-815-11	METAL, CHIP 330 5% 1/16W
R109	1-216-825-11	METAL, CHIP 2.2K 5% 1/16W
R110	1-216-825-11	METAL, CHIP 2.2K 5% 1/16W
R111	1-216-809-11	METAL, CHIP 100 5% 1/16W
R112	1-216-809-11	METAL, CHIP 100 5% 1/16W
R113	1-216-809-11	METAL, CHIP 100 5% 1/16W
R114	1-216-809-11	METAL, CHIP 100 5% 1/16W
R115	1-216-864-11	METAL, CHIP 0 5% 1/16W
R117	1-216-864-11	METAL, CHIP 0 5% 1/16W
R118	1-216-809-11	METAL, CHIP 100 5% 1/16W
R119	1-216-809-11	METAL, CHIP 100 5% 1/16W
R121	1-216-864-11	METAL, CHIP 0 5% 1/16W
R122	1-216-864-11	METAL, CHIP 0 5% 1/16W
R125	1-216-809-11	METAL, CHIP 100 5% 1/16W
R126	1-216-809-11	METAL, CHIP 100 5% 1/16W
R127	1-216-809-11	METAL, CHIP 100 5% 1/16W
R128	1-216-809-11	METAL, CHIP 100 5% 1/16W
R129	1-216-809-11	METAL, CHIP 100 5% 1/16W
R130	1-216-809-11	METAL, CHIP 100 5% 1/16W
R131	1-216-809-11	METAL, CHIP 100 5% 1/16W
R132	1-216-809-11	METAL, CHIP 100 5% 1/16W
R133	1-216-809-11	METAL, CHIP 100 5% 1/16W
R134	1-216-809-11	METAL, CHIP 100 5% 1/16W
R135	1-216-809-11	METAL, CHIP 100 5% 1/16W
R136	1-216-809-11	METAL, CHIP 100 5% 1/16W
R137	1-216-809-11	METAL, CHIP 100 5% 1/16W
R138	1-216-809-11	METAL, CHIP 100 5% 1/16W
R139	1-216-809-11	METAL, CHIP 100 5% 1/16W
R140	1-216-809-11	METAL, CHIP 100 5% 1/16W
R141	1-216-809-11	METAL, CHIP 100 5% 1/16W
R142	1-216-809-11	METAL, CHIP 100 5% 1/16W
R143	1-216-809-11	METAL, CHIP 100 5% 1/16W
R144	1-216-809-11	METAL, CHIP 100 5% 1/16W

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Ref. No. or Q'ty	Part No.	Description
R145	1-218-716-11	METAL 10K 0.50% 1/16W
R146	1-218-716-11	METAL 10K 0.50% 1/16W
R147	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R148	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R149	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R201	1-216-846-11	METAL, CHIP 120K 5% 1/16W
R202	1-216-842-11	METAL, CHIP 56K 5% 1/16W
R203	1-216-837-11	METAL, CHIP 22K 5% 1/16W
R204	1-216-809-11	METAL, CHIP 100 5% 1/16W
R205	1-216-843-11	METAL, CHIP 68K 5% 1/16W
R206	1-216-813-11	METAL, CHIP 220 5% 1/16W
R207	1-216-825-11	METAL, CHIP 2.2K 5% 1/16W
R208	1-216-825-11	METAL, CHIP 2.2K 5% 1/16W
R210	1-216-864-11	METAL, CHIP 0 5% 1/16W
R211	1-216-817-11	METAL, CHIP 470 5% 1/16W
R212	1-216-793-11	METAL 4.7 5% 1/16W
R213	1-216-793-11	METAL 4.7 5% 1/16W
R214	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R215	1-216-824-11	METAL, CHIP 1.8K 5% 1/16W
R216	1-216-827-11	METAL, CHIP 3.3K 5% 1/16W
R217	1-216-829-11	METAL, CHIP 4.7K 5% 1/16W
R218	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R219	1-216-834-11	METAL, CHIP 12K 5% 1/16W
R220	1-216-831-11	METAL, CHIP 6.8K 5% 1/16W
R221	1-216-797-11	METAL, CHIP 10 5% 1/16W
R222	1-216-797-11	METAL, CHIP 10 5% 1/16W
R223	1-216-797-11	METAL, CHIP 10 5% 1/16W
R224	1-216-797-11	METAL, CHIP 10 5% 1/16W
R225	1-216-816-11	METAL, CHIP 390 5% 1/16W
R226	1-216-816-11	METAL, CHIP 390 5% 1/16W
R227	1-216-864-11	METAL, CHIP 0 5% 1/16W
R228	1-216-809-11	METAL, CHIP 100 5% 1/16W
R229	1-216-809-11	METAL, CHIP 100 5% 1/16W
R230	1-216-857-11	METAL, CHIP 1M 5% 1/16W
R231	1-216-857-11	METAL, CHIP 1M 5% 1/16W
R300	1-216-829-11	METAL, CHIP 4.7K 5% 1/16W
R301	1-216-827-11	METAL, CHIP 3.3K 5% 1/16W
R302	1-216-815-11	METAL, CHIP 330 5% 1/16W
R303	1-216-815-11	METAL, CHIP 330 5% 1/16W
R304	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R305	1-216-808-11	METAL, CHIP 82 5% 1/16W
R306	1-216-847-11	METAL, CHIP 150K 5% 1/16W
R307	1-216-835-11	METAL, CHIP 15K 5% 1/16W
R308	1-216-837-11	METAL, CHIP 22K 5% 1/16W
R309	1-216-845-11	METAL, CHIP 100K 5% 1/16W
R310	1-216-828-11	METAL, CHIP 3.9K 5% 1/16W
R311	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R312	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R313	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R314	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R315	1-216-815-11	METAL, CHIP 330 5% 1/16W
R316	1-216-837-11	METAL, CHIP 22K 5% 1/16W
R317	1-216-827-11	METAL, CHIP 3.3K 5% 1/16W
R318	1-216-827-11	METAL, CHIP 3.3K 5% 1/16W
R319	1-216-827-11	METAL, CHIP 3.3K 5% 1/16W
R320	1-216-813-11	METAL, CHIP 220 5% 1/16W
R321	1-216-827-11	METAL, CHIP 3.3K 5% 1/16W
R322	1-216-809-11	METAL, CHIP 100 5% 1/16W
R323	1-216-809-11	METAL, CHIP 100 5% 1/16W

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Ref. No. or Q'ty	Part No.	Description
R324	1-216-817-11	METAL, CHIP 470 5% 1/16W
R325	1-216-824-11	METAL, CHIP 1.8K 5% 1/16W
R326	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R327	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R328	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R329	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R330	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R331	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R332	1-216-845-11	METAL, CHIP 100K 5% 1/16W
R333	1-216-845-11	METAL, CHIP 100K 5% 1/16W
R334	1-216-845-11	METAL, CHIP 100K 5% 1/16W
R335	1-216-845-11	METAL, CHIP 100K 5% 1/16W
R336	1-216-845-11	METAL, CHIP 100K 5% 1/16W
R337	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R338	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R339	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R340	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R342	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R343	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R344	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R345	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R346	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R347	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R348	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R349	1-216-**842-01**	**RESISTOR, CHIP 56K 1/16W (1608)**
R350	1-216-**842-01**	**RESISTOR, CHIP 56K 1/16W (1608)**
R351	1-216-**842-01**	**RESISTOR, CHIP 56K 1/16W (1608)**
R352	1-216-**842-01**	**RESISTOR, CHIP 56K 1/16W (1608)**
R353	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R354	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R355	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R356	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R357	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R358	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R359	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R360	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R361	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R362	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R363	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R364	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R365	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R366	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R367	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R368	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R369	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R370	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R371	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R372	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R373	1-216-295-91	METAL, CHIP 0 5% 1/10W
R374	1-216-295-91	METAL, CHIP 0 5% 1/10W
R375	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R376	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R377	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R378	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R379	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R380	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R381	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R382	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R383	1-216-833-11	METAL, CHIP 10K 5% 1/16W

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Ref. No. or Q'ty	Part No.	Description
R384	1-216-846-11	METAL, CHIP 120K 5% 1/16W
R385	1-216-847-11	METAL, CHIP 150K 5% 1/16W
R386	1-216-845-11	METAL, CHIP 100K 5% 1/16W
R387	1-216-841-11	METAL, CHIP 47K 5% 1/16W
R388	1-216-838-11	METAL, CHIP 27K 5% 1/16W
R389	1-216-821-11	METAL, CHIP 1K 5% 1/16W
R390	1-216-864-11	METAL, CHIP 0 5% 1/16W
R391	1-216-864-11	METAL, CHIP 0 5% 1/16W
R392	1-216-829-11	METAL, CHIP 4.7K 5% 1/16W
R393	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R394	1-216-833-11	METAL, CHIP 10K 5% 1/16W
R395	1-216-864-11	METAL, CHIP 0 5% 1/16W
R396	1-216-821-11	METAL, CHIP 1K 5% 1/16W
RV1	1-241-175-11	RES, ADJ, INDIVIDUAL METAL 220
RV2	1-238-090-11	RES, ADJ, 10K
RV201	1-241-092-11	RES, ADJ, INDIVIDUAL METAL 47K
RY1	1-515-614-11	RELAY
S301	1-572-999-11	SWITCH, SLIDE
S302	1-762-299-11	SWITCH, DIP (PIANO TYPE)
S303	1-572-999-11	SWITCH, SLIDE
X101	1-760-094-11	RESONATORVIBRATOR, CRYSTAL
X301	1-579-125-11	RESONATOR, CERAMIC

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